FLIGHT and The AIRCRAFT ENGINEER

First Aeronautical Weekly in the World : Founded 1909

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Editorial, Advertising and Publishing Offices: DORSET HOUSE, STAMFORD STREET, LONDON, S.E.1
Telegrams: Truditur, Sedist, London. Telephone: Waterloo 3333 (35 lines).

8-10, CORPORATION ST., COVENTRY. Telegrams: Autocar, Coventry. Telephone: Coventry 5210.
GUILDHALL BUILDINGS, NAVIGATION ST., BIRMINGHAM, 2. Telegrams: Autopress, Birmingham. Telephone: Midland 2971 (5 lines).
260, DEANSGATE, MANCHESTER, 3. Telegrams: Iliffe, Manchester. Telephone: Blackfriars 4412.
26B, RENFIELD ST., GLASGOW, C.2. Telegrams: Iliffe, Glasgow. Telephone: Central 4857.

SUBSCRIPTION RATES: Home and Abroad: Year, £3 1 0. 6 months, £1 10 6. 3 months, 15s. 3d.
Registered at the G.P.O. as a Newspaper.

No. 1680. Vol. XXXIX. MARCH 6th, 1941 Thursdays, One Shilling.

The Outlook

Laudable Sentiments

"I SHOULD like to see much greater use made of documentary films—and of the trade and technical Press and broadcasting—in telling the story of the traditions, enterprise, resources and technical achievements of British industry to the world." Thus the Press Officer of the Board of Trade in a recent letter to the British Press.

That is precisely what *Flight* has been advocating for many months past, and what it has been trying to live up to within the limits imposed by censorship and defence regulations. But in our particular industry the difficulties of living up to that ideal are very considerable. It is not merely that we are prevented from publishing illustrations and descriptions of the latest types of military aircraft. That is right and proper, and we have no desire to tell the enemy anything which he should not know. But even facilities for visits to works are not readily granted, in spite of the fact that by no means all our factories are engaged upon the production of the latest and most secret types of aircraft.

Granted that few of the British construction firms are in a position to export aircraft at the present time (and, incidentally, the few which are have not found Government departments too ready to assist with the necessary permits and facilities), for the sake of British prestige abroad we hold strong views on the advisability of "telling the world" not only of our achievements in the air—that is done very well by the daily Press—but of our victories in the shops. Apparently the Press Officer of the Board of Trade shares this view, for in the letter mentioned he states: "Even where industries are unable to engage as actively as they might like in the export trade, it seems to me that it is well worth while keeping their achievements in the minds of overseas buyers." Precisely. And after the war the British aircraft industry will be among those which must do a brisk export trade if we are to win the peace as well as the war. It would be well if the different Government departments concerned could get together with a view to "implementing" such worthy sentiments as those quoted.

An Unfortunate Distinction

WHEN the Air Training Corps was launched last month one of the important claims made for it was that it offered exactly equal opportunity to every boy, no matter from what stratum of society he sprang. No difference was to be made between the son of a duke and the son of a dustman; each would be a cadet on precisely equal footing, and how he fared would depend entirely upon the boy himself.

In a country avowedly fighting for the survival of democracy this was emphatically the right idea, and we have no doubt whatever that, in so far as *opportunity* goes, this equality will be strictly maintained.

It is rather unfortunate, however, that the Air Council has decided upon a difference in uniform as between members of university squadrons and those of school and local units to which boys not quite so high in the social scale will inevitably belong. The former will wear collar and tie, but the tunics of the latter will button right up to the neck. Although all ranks of the R.A.F. wear collar and tie and, therefore, the style need not necessarily imply the higher status of commissioned rank, as it would with a khaki uniform, there can be no doubt that this distinction in dress is psychologically bad for the unity of the corps as a whole. It cannot fail to suggest, to both sections, a subtle difference in status and, since the collar and tie is the perquisite of commissioned ranks and senior non-commissioned ranks in the other two services, the implication cannot fail to be that members of the university squadrons have a higher status in the corps than their comrades in school and

local units. This, we suggest, is just as undesirable for the university cadet as for his humbler brother. It may be contended that most university cadets will be destined for commissioned rank when they pass on to the R.A.F. itself, and that only a comparatively small proportion of those in school and local squadrons will gain commissions, but by this time they will have finished with the A.T.C. A famous judge once remarked that not only must justice be done but it must manifestly be *seen* to be done, and although we repeat that we have no shadow of doubt of the equality of opportunity which the A.T.C. will provide, we feel that a distinction in uniform in favour of the 'varsity youth will, to say the least, make this democratic impartiality less obvious.

America Realises

THE President the Aeronautical Chamber of Commerce, Col. Jouett, said in Washington in January in regard to the use of the American automobile factories for aircraft manufacture:

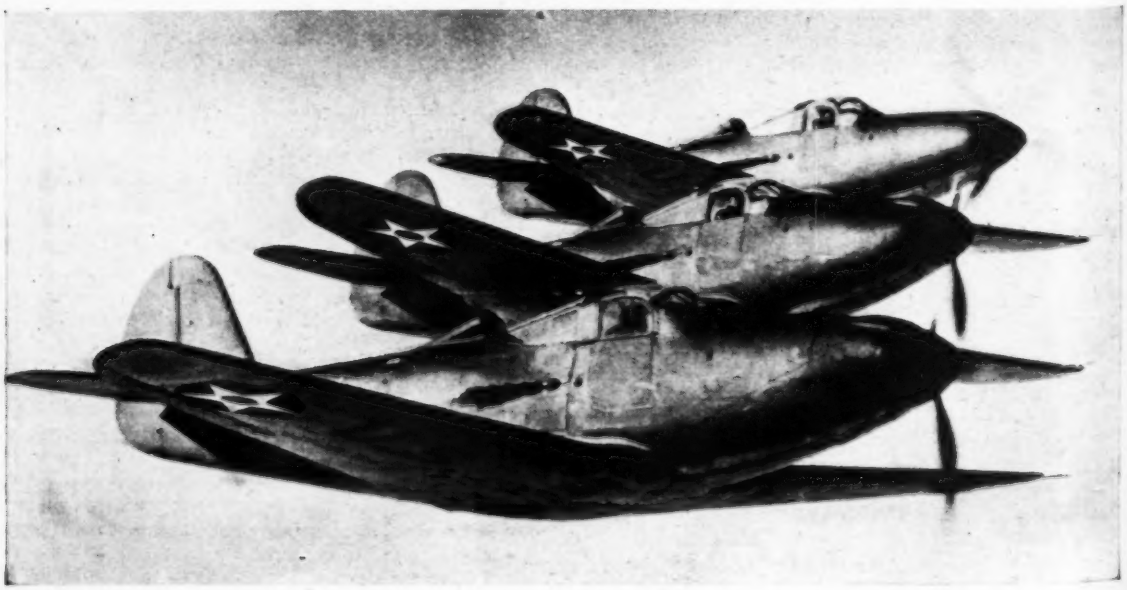
"Negotiations between the aeroplane and automobile companies are not yet completed, but enough progress has been made to know that this intelligent co-operation of the two industries will bear fruit. The motor car people have visited our plants for days at a time. Most of them admit that construction of aircraft is entirely a new and different art and one with which they are completely unfamiliar. We have every reason to believe that less than ten per cent. of the machine tools in the auto plants are usable in aeroplane manufacture. We understand that every one of those machine tools taken out of auto production would render others idle. . . . A committee of engineers from one of the most reputable automobile organisations in the world came to one of our larger aircraft engine factories. They inspected all the 800 component parts that went into the engine involved. After careful study their first conclusion was that their automotive equipment was suitable to the efficient production of only three out of those 800 parts. Further study led them to believe that to produce even those three components it first would be necessary to re-train their entire automotive shop personnel and make such extensive changes in their machine tools as to destroy any possible economy or speed or efficiency in production."

This realisation of the difficulties, but not the impossibility, of using the automobile factories augurs well for the future in U.S.A. It shows they are not entering upon their production job with their eyes shut, and it is in accord with the experience in this country. For the "shadow" factories here found that, although motor cars and aircraft are both automotive products, they are automotive products with a difference and cannot be turned out at the same rate. Another cause for congratulation is that there has been no talk in America of sacrificing quality for quantity; they also have learnt the lesson of 1940, that only the best equipment brings supremacy.

Not Even Detroit

SPEAKING of the proposal put up by an American labour organisation to produce 500 aircraft per day with the unused production facilities of the motor car industry, the so-called Reuther Plan, Col. Jouett said: "Laudable as this plan appears to be, there are certain phases of it that seem impracticable. . . . I seriously doubt the possibility of getting together the number of men in one locality required to produce 5,000 airplanes at the rate of 500 per day. That would require the services of between one and a half million and two million shop employees in the final manufacturing and assembling process alone. It would mean as many more employed in providing raw materials and preliminary processing—in other words, from two and a quarter to three million men as compared to about 300,000 employed in the aircraft industry at present.

"To go back to the general population problem, three million workers means a population of nine million, including their families; add to that the butcher, the baker, the candlestick maker to serve nine million persons and figure out how you can put a community like that in and around the Detroit area or in any other manufacturing centre in the United States."

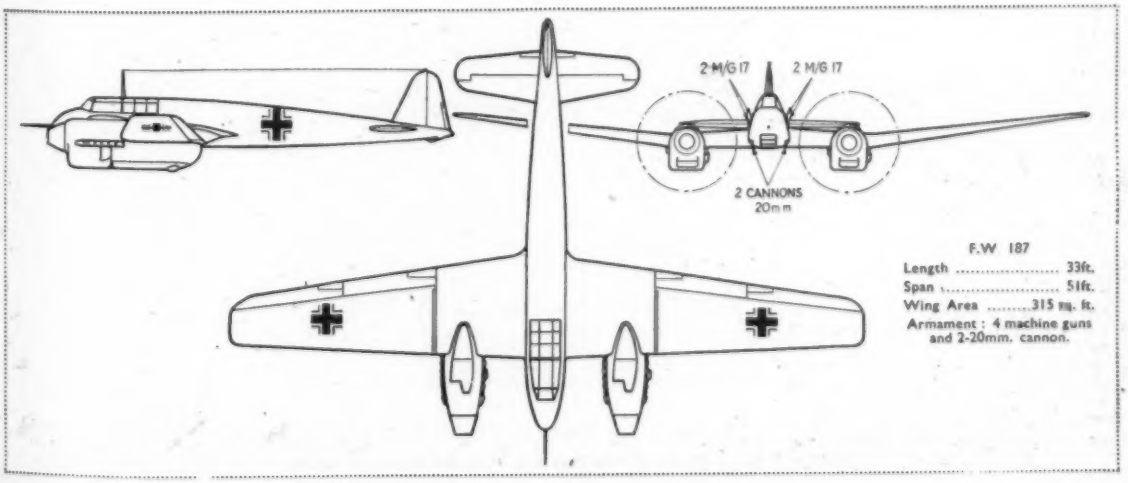


MEMBERS OF THE DEER FAMILY: Three Bell Caribous (P400 Airacobras in the U.S.A.) in "echelon to the left, stepped up." The Caribou is a single-seater fighter armed with one 20 mm. shell-gun and a battery of six machine guns. The 1,100 h.p. liquid-cooled Allison engine is mounted behind the pilot.

A GERMAN "DESTROYER"

Original "Flight" drawing by "J.P."

The Focke-Wulf F.W.187 is a twin-engined two-seater fighter of the class known in Germany as a "Zerstörer" (Destroyer). It has two Daimler-Benz D.B.601 engines and is credited with a speed of 320 m.p.h. at ground level, and a service ceiling of 38,000ft. The climb is reported to be 20,000ft. in 5.8 mins.



AIR AID : A Bristol Blenheim I returning from a bombing raid in Albania. The short-nosed Blenheim has done excellent work in the Near East.

War in

The Conquest of Somaliland : Bad Weather in Europe : The Balkan Crisis

ANYTHING may happen at any moment, but for most of the period reviewed this week the position has been as follows. The Germans have been massing on the frontier of Bulgaria, and Mr. Eden and General Sir John Dill have visited the Turkish Capital at Ankara. All has been quiet on the Tripoli front, but there has been a brush with German armoured cars in Libya. In all parts of East Africa the British Empire forces have been advancing with great success, especially in Italian Somaliland. Bad weather has slowed up the Greek operations in Albania—and, of course, they may have withdrawn some of their troops to the Bulgarian frontier to meet the new threat from that quarter. In Northern Europe bad weather has largely restricted air operations, though the R.A.F. has been as busy as possible by day and by night, while the Germans have mainly confined their efforts to raids by single aircraft. The situation may have changed before these words are published.

The Balkans

THE Germans, in their preparations to attack Greece through Bulgaria, have moved some hundreds of aircraft down to that front. Some of them have probably been withdrawn from Northern France, but probably not many long-range bombers have been transferred. It is likely that their Balkan Army will be accompanied by many dive-bombers, and that there will be an adequate supply of all such classes of aircraft as they think necessary. They probably do not expect to meet with very much opposition in the air down there. The Greek flying corps is admittedly small, and though the Air Ministry has been building up the strength of the Middle East Command, no details have been made public.

An Echo of 1917

BRITISH forces have occupied the small island of Kastellorizo which lies less than a mile off the southernmost point of Asia Minor, where the Italians had a seaplane base. If Turkey should join in the war, it is just as well that this base should be in Allied hands. The mention of this island recalls an incident in the late war. In January, 1917, Commander (afterwards Air Commodore) Samson was in command of the little seaplane-carrier *Ben-my-Chree*, and he took it into the harbour there, where a French Admiral was already located. An undiscovered Turkish battery on the mainland suddenly shelled the vessel, set her on fire, and sank her. That sort of thing will not happen in this war, now that the Turks are our good friends.

The invasion of Italian Somaliland has been another astonishing example of the speed with which the troops under General Wavell habitually move. The Lieut. General in command in that part is a namesake of the Admiral who is C.-in-C. of the Mediterranean Fleet, namely, Cunningham. On February 14 his troops took the port of Kismayu; on February 24 they added another seaside place, Brava, having also swept into their net the smaller places of Jumbo, Margherita, and Gelib or Jelib, and on February 25 they occupied Mogadishu, the capital of the Italian Colony. The distance between Brava and Mogadishu is 100 miles. These operations have afforded another example of co-operation between the three Services. All the way the South African Air Force has been acting as the eyes and the field artillery for the Army, while the Navy has sent warships to shell the Italian troops on the coast road. Perhaps some of the advance was made by embarking troops on ships, but that is not known at present. Mogadishu is a fairly large city, with 8,000

INVASION PORT INVADED: General Fieldmarshal Goering visits a Channel Port. On the extreme left is Gen. Loerzer; pointing is State Secretary Korner and on the right, Gen. Sperrle.

in the Air

Italian inhabitants, in addition to its African population. Many prisoners were taken, and if any of the defeated enemy are trying to escape they will have to traverse an arid desert.

The conquest of Eritrea has been proceeding more slowly, as the country is very hilly, and round Keren the Italians have made the most determined stand which they have yet made anywhere. In such country the transport of guns is particularly difficult, and for that reason the use of aircraft as artillery of the air is especially useful. There, too, the South Africans are doing splendid work, and the R.A.F. also takes its share.

Some African Colour

THE aircraftmen in these regions have a very onerous life. Often twice, and sometimes three times, a day bombers are bombed up and fuelled for flights over enemy territory; then as they return the ground crews take charge and work at high pressure to prepare the aircraft for another raid. The crews living in hot and dusty quarters, with very few comforts, are displaying an amazing spirit and keenness. Among the hardest-worked men are the armourers. They have tons of high explosives and incendiaries to fuse and load on the bombers, and thousands of rounds of machine-gun ammunition to prepare for the bombers' guns. All this work has to be done in oppressive heat with no shade at all, amid the clouds of stifling dust raised by the aircraft as they are run up. On some of the aerodromes the quarters consist of "tukuls" which are round native mud huts with grass roofs. "Not very comfortable, but at least they are very cool inside," is the airmen's verdict on these. Our advance into Eritrea has been so rapid that there has been little time to organise comfort anywhere. Squadron Leaders sit on empty boxes in tin-roofed huts, making plans on maps that become coated with dust while they look at them. Despatch-riders come and go like sandy ghosts. Heat and dust make things very trying, but the Italian receives his load of bombs according to plan just the same.

But stranger things than that happen during a campaign in Africa. Wind-socks have a fascination for the African native, and thereby some inconvenience was caused to a squadron of the Fleet Air Arm temporarily established ashore. No sooner had a wind-sock been hoisted on the flying field than it mysteriously disappeared. Watchers never succeeded in catching the thief. At last the Commanding Officer of the squadron had a bright idea, and that is why the following report was received by the Commanding Officer of one of His Majesty's aircraft carriers off the African coast, and was forwarded by him to his Commander-in-Chief:—

"The attached correspondence concerning the purchase of a Ju-Ju from a native witch doctor is submitted for information. This claim has been met out of the Medical Comforts' Fund, as the Ju-Ju was supplied by a member of the medical profession. It is not, however, considered that the qualifications of any of the R.N. or R.A.M.C. doctors serving in the district would have enabled them to produce the desired effect. The retention of a local practitioner is therefore considered justified. The Ju-Ju consisted of a bunch of chicken feathers well soaked in chicken blood and held together by strips of snake-skin. The witch doctor buried the Ju-Ju in the earth at the foot of the wind-sock and covered it over with cement to enable the curse of the Ju-Ju—a black snake—to emerge and attack any prospective thief. The Commanding Officer of the Flight speaks very highly of the efficiency of the Ju-Ju, and I concur with him, observing that before the installation of the Ju-Ju no wind-sock ever remained *in situ* for more than 48 hours, while after its application the wind-sock was untouched.

"The cost—four shillings and two empty lemonade bottles—is not therefore considered excessive.

"It is considered that this information might be welcome to the Air Ministry for distribution to Commanding Officers of aerodromes in Africa who are pestered by petty pilfering."

AFTER THE BATTLE: Intelligence officers of the R.A.F. giving the "once-over" to wrecked Italian aircraft captured at Benina aerodrome, Benghazi.

Hunting the "Hipper"

THE R.A.F. recently learnt that the German 10,000-ton cruiser *Hipper* (or one of her class) had put into Brest harbour, and the Bomber Command consequently undertook a number of raids on that port, using the heaviest type of bomb. Brest is in any case the most important of the "invasion ports." One of the most severe raids was delivered on February 24th, and it was afterwards announced that the German Naval Commander for Occupied Territory, Vice-Admiral von Arnauld de la Perière, met with an accident that day which cost him his life. There is no proof that what he met was a British bomb, but the coincidence is certainly suggestive. In the last war this Admiral was a U-boat commander, and earned the *Pour le Mérite*, the highest German decoration for valour. The decoration was instituted by Frederick the Great, who considered that French was the only language that an educated gentleman ought to speak.

The weather at the end of February was mostly bad, and only a small number of German bombers went in for raiding Great Britain by day or by night, though there were some raids of moderate intensity in the west of our island. For the rest, it was a case of nuisance bombing, and at night many districts of London heard no sound of engines or guns though others received H.E. and fire bombs.

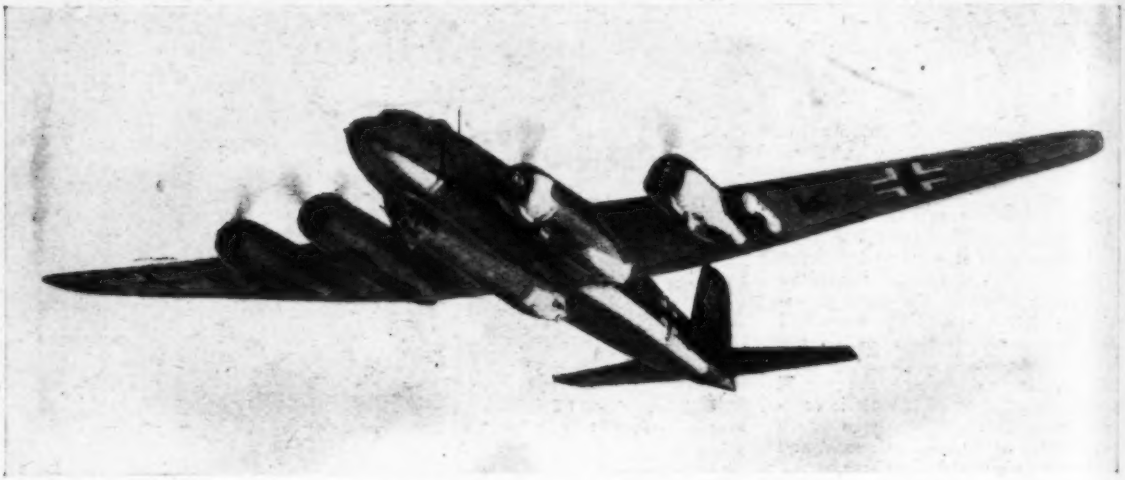
The R.A.F. defied the weather whenever it was in any way possible, and there were a number of daylight sweeps by bombers with fighter escorts. When raiding the invasion ports the bombers mostly concentrate on the quays and embarkation facilities rather than on the barges themselves. Barges are easily replaced, and the subtle Hun may be wily enough to draw up dummy barges in order to distract bombs from more valuable targets.

Sir Archibald Sinclair, Air Minister, recently made an encouraging speech to the English-Speaking Union. He quoted extracts from a letter from a German correspondent to a friend dealing with a recent raid on Mannheim. Thanking his friend for a present of coffee, the German wrote:—

"The coffee will be so good for us during the long nights we have to spend in the cellar. What we poor people have to endure here—terror, fear, fire. We experienced a great attack; words cannot describe it. Seven hours in the cellar. There were said to have been more than 200 aircraft—a rain of bombs over our town, fires everywhere, no light, no water.

"We were not even dressed when bombs began to fall, and at once the lights went out in our street. There was a terrible blaze. The greatest shock we had was the burning down of the oil mill and the danger to life. I cannot tell you what we went through. People were in their cellars all night—the houses burning above, nothing but incendiary bombs.

WAR IN THE AIR (Continued)



SHIPPING RAIDER: The four-engined Focke-Wulf "Kurier" which is being used for long-range attacks on our merchantmen in the Atlantic. It is a development of the F. W. "Condor" civil machine. The horse-power has been nearly doubled by fitting four 14-cylinder B.M.W. radials of 1,300 h.p. each. Bombs are carried in the projection beneath the fuselage, which also houses forward and rear-firing turrets. Taking a leaf from our book, the Germans are fitting a four-gun power-operated turret on the top deck. No official performance figures are available, but, having regard to the known speed of the civil version, it is reasonable to expect a top speed in the region of 270 m.p.h. A crew of six is carried.

"There was no fire brigade, no water, so everything just went on burning in the oil mill. The Karlsruhe fire brigade finally put the fire out. The next day the bombs were exploded (Sir Archibald explained that this was a reference to R.A.F. delayed-action bombs). Our house shook. We dread the night, and go to bed with our clothes on. It is so terribly cold, and we have so little coal. It causes a lot of death, more than one knows. If it goes on like this the people will be finished."

Commenting on this letter, Sir Archibald said: "We hate the cruelty of these bombardments. We never wanted war, with all its horror and destruction, but the Nazis brought it on the world. They spared no horror to Coventry or Birmingham or London—and we must 'be copy now to men of grosser blood and teach them how to war.'"

Inferno at Cologne

MANNHEIM has evidently not been a health resort for neurasthenic Germans, but upsetting the nerves of German civilians will by itself not induce Hitler to give up his ill-gotten gains and sue for peace. Some writers are now urging that German nerves will not stand up to bombing in the way that British nerves have done. That may be true, but while the German armies are still the conquerors of most of Europe, will Hitler care what the civilians think? It is a very slow process for civilian demoralisation to sap the fighting qualities of disciplined troops.

The Bomber Command takes its targets in due rotation, getting advice from the best authorities. Its latest choice has been Cologne, and there has been a series of very fierce raids by night on the targets in that city. On one night the British bombers went there and returned in rapid succession for three hours, and they left the place a raging inferno, as one pilot put it. Let us hope they destroyed some main source of supply of an article urgently needed for the German advance into the Balkans.

The trouble is that Germany has been preparing for war for so long and has militarised her industries so thoroughly that it is very hard for bombing raids to make a fatal impression on her supplies.

The adherence of Bulgaria to the Tripartite Pact is deplorable, but at the last moment the Bulgars could not have resisted the German forces, even if they had had a mind to do so. At an earlier date a real alliance of all the Balkan States might have been effectual, but they have delayed matters, even as the Scandinavian and Low Countries did. The advance of the Germans through the passes of the mountains into Greece should not be an easy matter, and there should be some grand opportunities for Allied aircraft to attack them in the passes. At present we do not know the strength of the resistance which Greece and Britain (and, probably, Turkey) have been able to prepare. That will only be revealed by degrees as the campaign develops.

Later accounts of the affair at Kastelorizo show that at first there was resistance to the British naval forces, but when aircraft (presumably from a carrier) appeared to back up the warships the resistance melted away. After destroying the seaplane base the British forces were withdrawn. The Turks may be expected to occupy the island, as it is close to their shores.

There has been heavy air fighting in Albania. In one great fight the British were outnumbered by more than two to one, but they shot down no fewer than 26 Italian machines without loss to themselves. A few days later a single R.A.F. fighter saw five Italian machines and, *more Britannico*, he at once attacked them. He shot down three, and then the other two fled. Air Chief Marshal Sir Arthur Longmore has been in Greece, where Mr. Eden and General Sir John Dill have also arrived, and he congratulater A.V-M. D'Albiac's contingent on their extremely gallant work.

Malta is still the victim of enemy raids, sometimes by as many as 40 enemy machines at a time. On one such occasion our fighters shot down two definitely and so damaged six more that they were not expected to reach their base, while the A.A. guns made a bag of five. Those gunners at Malta shoot well. In one recent raid some enemy aircraft, presumably German, made a deliberate attack on the Imtarfa Hospital at Malta.

Greece has had to endure earthquake as well as war. There has been a bad shock at Larissa, and many buildings collapsed. One party of R.A.F. airmen was buried for a while, but when they were extricated they all set to and worked unceasingly for a day and a night to rescue others. The R.A.F. hurried up ambulances to take the injured to hospital, and a British aeroplane flew a number of R.A.M.C. men to the spot.

As a sharp contrast, Italian aircraft bombed the stricken town while the rescue work was going on. The Italians now seem anxious to rival their German Allies in brutality.

AIR LOSSES TO MARCH 1.

	GERMAN	BRITISH		MIDDLE EAST	
	Aircraft	Fighters	Pilots	Enemy Aircraft	British Aircraft
Feb. 23	—	—	—	10	2
,, 24	—	—	—	—	—
,, 25	4	—	—	3	1
,, 26	1	2	2	7	3
,, 27	—	—	—	12	—
,, 28	—	—	—	28	—
Mar. 1	5	—	—	5	—
	10	2	2	65	6

British bombers and fighters lost over enemy territory: Feb. 23, 1; Feb. 24, 1; Feb. 25, 1; Feb. 26, 5; Feb. 28, 1; March 1, 3. Total 12.

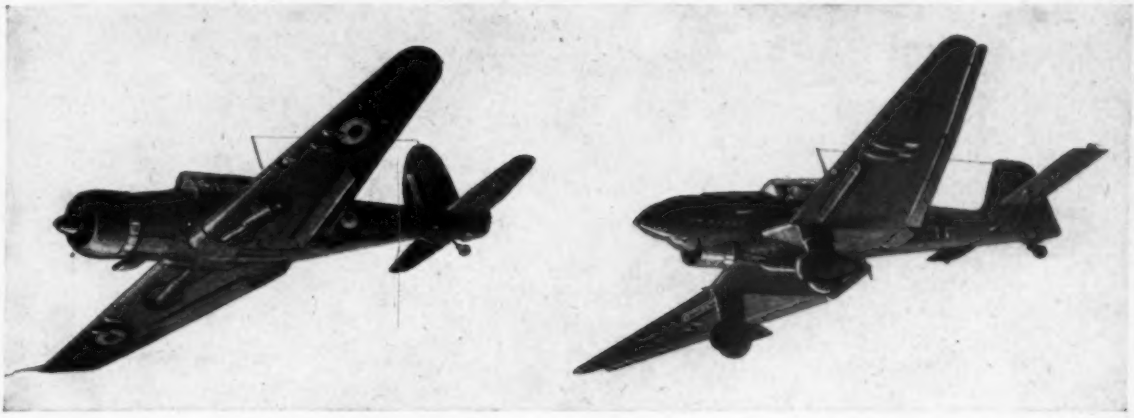
Enemy losses by R.A.F. and ground defences in Northern Area, 4,253.

In the Middle East the R.A.F. have destroyed about 1,092 and have lost 117.

Ninth of the Series

FRIEND or FOE?

Dissimilar Aircraft with Similar Duties; New Basis of Comparison



Blackburn Skua. Pronounced taper to trailing-edge of wing and small turned-up tips. Radial engine. Gun position behind pilot. Wheels retract outwards. Fin and rudder set well forward in relation to tapering cantilever tailplane.

Junkers Ju 87. Sharply cranked wings; marked taper on both edges; small square tips. In-line engine with "beard" radiator. Gun position behind pilot. Fixed undercarriage legs with spats. Square-cut fin and rudder; rectangular strut-braced tailplane.

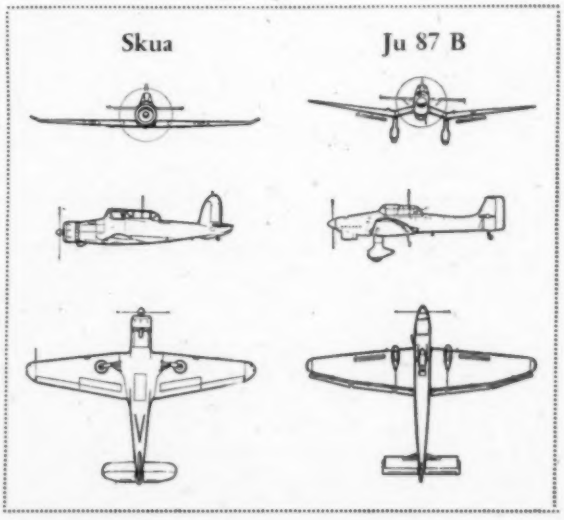
COMPARISON of opposing types of Allied and enemy aircraft in this series of articles to help the spotter has so far been based almost entirely upon external resemblance. The most familiar British and American machines have been described alongside German "opposite numbers" which have visited, or are likely to visit, this country during the present conflict and with which they might be confused. There is, however, a number of aircraft on both sides which have no "opposite number" in the matter of design or appearance but which perform very similar duties. Some of these, especially the Germans, are not likely to be familiar to the general public, while others may be seen often enough, say, near the South Coast, but rarely, if ever, seen any distance inland. Beginning this week, therefore, the "Friend or Foe?" page will include some of these less widely known or less frequently encountered types which perform more or less parallel operational duties. This should greatly assist the spotter who may one day be confronted with a type of machine strange to him.

There is, incidentally, a wider variety of British and American types than of German. Moreover, since Italian aircraft are not likely seriously to trouble the spotter in this country, it is not proposed to burden him with many of the last-named at present, but one or two of the more British-looking types may be introduced.

We begin to-day with the Blackburn Skua and the Junkers Ju 87, both of which are single-engined, two-seater dive-bombers operating mainly over or near the sea. The Skua has wings which taper sharply on the trailing-edge to turned-up tips. Its wheels retract outwards; it has a radial engine and a gun position immediately behind the pilot under the same transparent cockpit cover. Its most notable feature, however, is that the fin and rudder are set well forward in relation to the tapering tailplane. Almost identical with the Skua is the Roc, which, however, is a two-seater fighter and can be distinguished from the Skua by its dome-shaped gun-turret and the fact that its wing-tips do not turn up. Both these machines are used by the Fleet Air Arm and mainly operate away from this country.

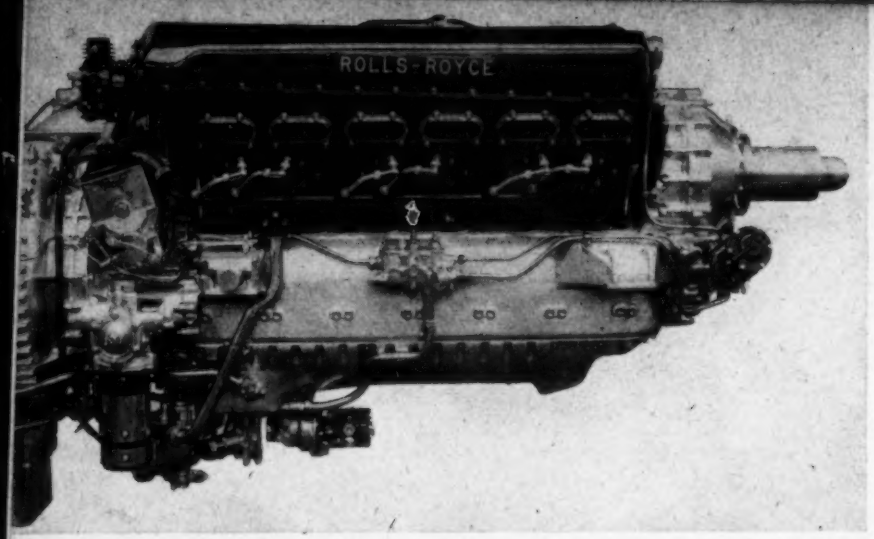
The Ju 87 is an easy enemy to identify by virtue of its sharply cranked wings, which, when seen in plan, taper along both edges to small, square tips. Dive-brakes come into operation beneath the wings when the machine attacks. It has an inverted Vee in-line engine with "beard" radiator and fixed undercarriage legs with spats. There is a gun position at the rear of the pilot's "glass-house." It has a square-cut fin and rudder and a rectangular tailplane externally braced by inverted Vee struts. The whole appearance of this aircraft is extremely angular.

Later in this series, when the list of those Allied and enemy types which offer direct comparison have been completed, we shall deal with those aircraft which are entirely distinctive and have no opposing counterpart. The Germans, for example, would appear to possess (at present, anyhow) neither a two-seater Fleet-fighter nor a night-fighter, such machines as our night-bombers have so far encountered being Me 109s and He 113s.



Types previously compared: (1) Hurricane and Me 109. (2) Spitfire and He 113. (3) Beaufort and Ju 88. (4) Lysander and He 126. (5) Hudson and Me 110. (6) Anson and Fw 187. (7) Hereford and Do 215. (8) Blenheim IV and Heinkel He 111K.

Next Week: Fairey Swordfish, and Arado Ar 95.



The Rolls-Royce Merlin X has a cylinder capacity of 27 litres—

THE CASE CARBU

A Comparison of the Fuel Performance of Petro Carburetto

THE idea that engines which are equipped with direct petrol injection systems are capable of better fuel economy than equivalent carburettor engines is widely held, and seems to have been strengthened recently as a result of bench tests made on captured German aero engines using the system.

Of late some prominence has been given to this theory, both in the lay and technical press, and a recent editorial article in a well-known journal stated that it was quite probable that the Germans have adopted petrol injection because it gives an advantage at altitudes above 25,000 or 30,000ft., due to the fact that no restriction is offered to the breathing of the engine. It is stated that the carburettor offers a restriction to breathing at high altitudes due to the much larger quantity of the rarefied air required.

The usual claims for the direct fuel injection system, such as freedom from freezing, very good fuel economy and the possible use of slightly lower-grade fuels, are also mentioned in the article in question.

Articles such as this are read by a considerable number of people, and it is surprising how many have accepted them without questioning their validity. Doubtless many members of the Flying Services read these articles, and it would seem a pity if they should gather the impression that the British engines are inferior in fuel economy and altitude performance to the German engines.

In actual fact, the current British engines develop considerably greater power at high altitudes than any engines yet in service with the *Luftwaffe*, and it is not expected that the Germans are likely suddenly to introduce any new types with very greatly improved performance.

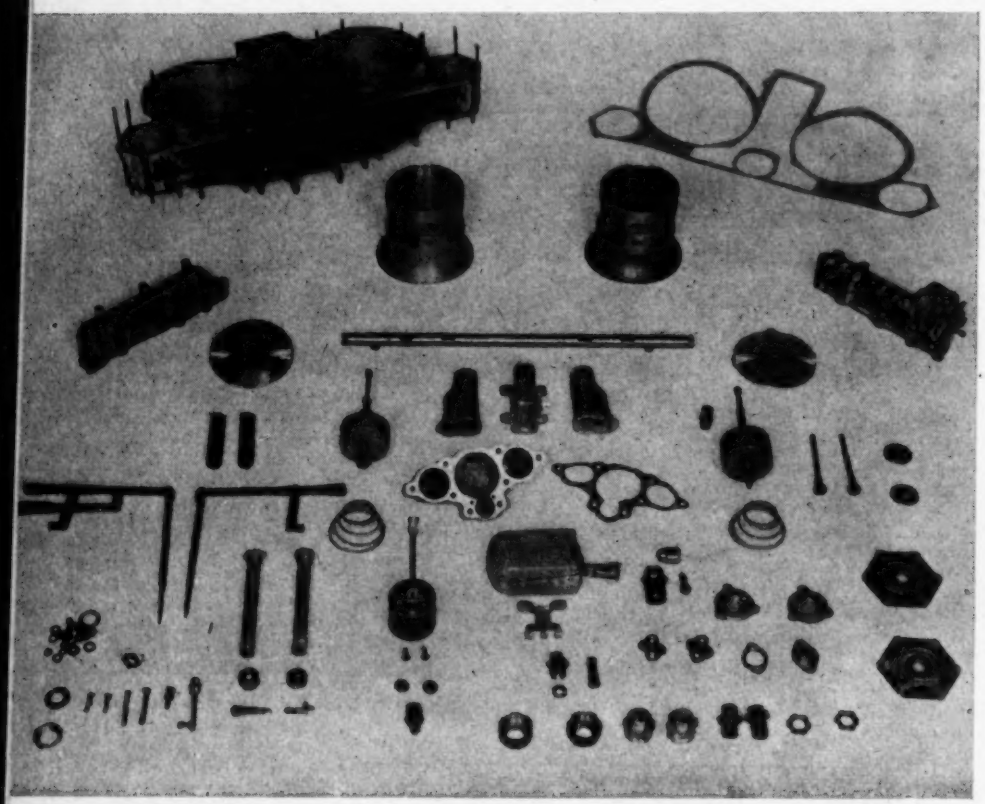
It is hoped that the following performance comparison of a German and an English engine will show that we are in no way inferior to our adversaries in respect of aero engine design.

Comparison of Fuel Economy

Tests were made at the Royal Aircraft Establishment on two Junkers Jumo 211D. engines removed from a Heinkel 111 aircraft. These engines are fitted with the Junkers direct petrol injection equipment. Fuel consumption loops were taken at three different speeds. The starting point of each loop was at the fuel consumption given by the automatic mixture regulator, and a special manual control was fitted to enable the mixture strength to be weakened off from these points.

The curves so obtained are shown on Fig. 1. It will be noticed that the consumptions obtainable with the flight setting of the automatic mixture regulator are up to 14.5 per cent. above the absolute best economy conditions, which are, of course, the bottom points of the consumption loops.

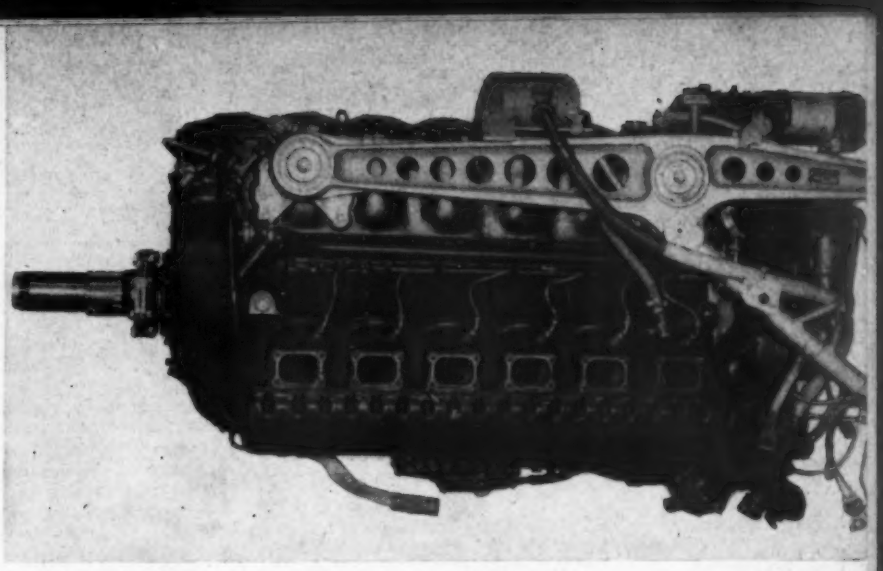
The Rolls-Royce Merlin X engine is the nearest English equivalent to the Jumo 211D. engine, and has been taken for purpose of comparison with it. Both are 12-cylinder, liquid-cooled types fitted with 2-speed



Component parts of the Rolls-Royce Merlin carburettor, shown in this photograph, number 433, including Amal valve and fuel pipes.

FOR THE RETTOR

Economy and High-Altitude Injection and Engines



—compared with the 35 litres capacity of the Junkers Jumo 211.

superchargers and are normally rated on 87 octane fuel. Analysis of samples of German fuel indicate, however, that the fuel used is of 92 octane when rated by the British method.

The bore and stroke of the Jumo engine are 5.91in. and 6.50in. respectively, whereas the Merlin is 5.40in. x 6.00in. These dimensions give the German engine 29.5 per cent. greater cylinder capacity than the Merlin, but in spite of this its maximum power output in both supercharger gears is approximately 11 per cent. less than the Merlin X at the latter's maximum power altitudes. In addition, the German engine operates at 6.5 : 1 compression ratio against the 6.0 : 1 of the Merlin. This difference in compression ratio should give the German engine an advantage of rather more than 3 per cent. in power output, and at the same time 3 per cent. lower fuel consumption.

Tests at Same Piston Speed

In view of the difference in dimensions of the two engines the Merlin consumption tests were not made at the same crankshaft speeds as the German engine tests, but at speeds which give the same piston speed. It was necessary to run the Merlin engine 8.25 per cent. faster on this account, and it would be reasonable to claim that the Merlin was, therefore, at a slight disadvantage, since the mechanical efficiency of an engine falls off as the speed increases. At the r.p.m. giving the same piston speeds the Merlin impeller tip speed is about 5 per cent. lower than the Jumo, and, therefore, the power to drive the supercharger is about 10 per cent. lower. On the other hand, the Merlin supercharger compresses fuel with the air and this increases the power required by some 7 per cent. Since, under economical cruising conditions, the supercharger power is small, the two effects annul one another, and it is legitimate directly to compare the performance of the two engines at the same piston speed and b.m.e.p.

Fig. 2 shows the results obtained on two Merlin X engines, and it will be seen that the maximum fuel economy is nowhere more than 2½ per cent. less than the consumptions recorded with the carburettor operating in the automatic weak cruising position. This compares very favourably with the maker's setting of the injection pumps on the Jumo engines, which gave up to 14½ per cent. above the ideal consumption.

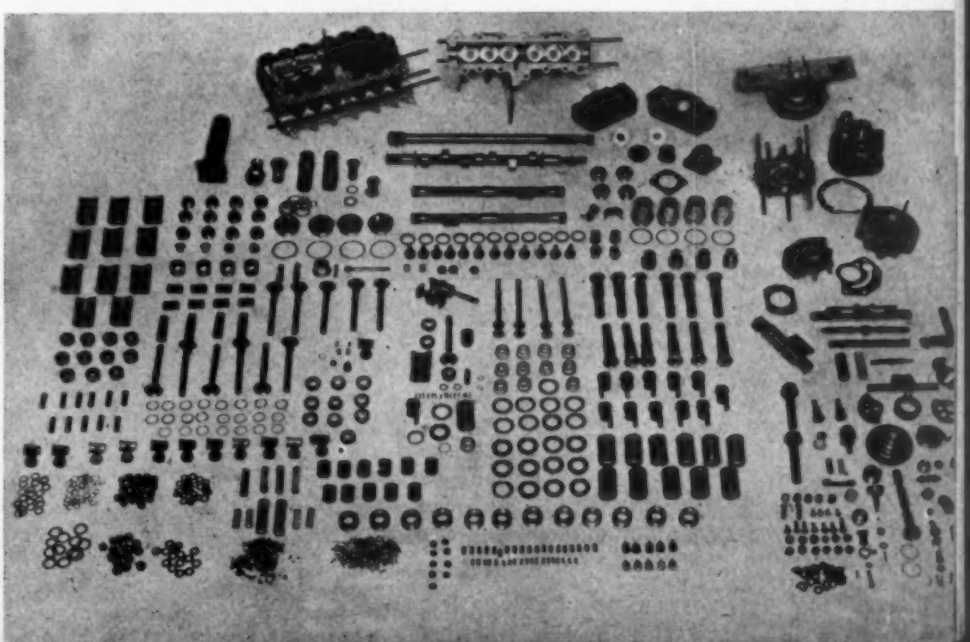
Figs. 3 and 4 compare the actual specific fuel consumptions of the Merlin and Jumo engines, and it will be seen that, even without allowing for the 3 per cent. difference due to compression ratio, the ideal consumption of the Merlin engine is practically the same as that of the German engine, except at the lowest speed and power conditions, where it is 4 per cent. worse; but, what is of far more practical importance, the consumptions given by the automatic mixture regulator are lower for the Merlin engine, over the whole range of speeds, than the comparative consumptions obtained on the German engines. The advantage over the whole range is some 7 per cent. (without the 3 per cent. compression ratio allowance).

The adverse ideal consumption of the Merlin at the very low speeds is probably due to the fact that the engine is designed for much higher operational speeds than the Jumo engine, and the high-speed valve timing adopted is probably responsible for the difference.

Altitude Performance

The editorial article mentioned at the beginning of this report states that the carburettor offers a restriction to the breathing of the engine, and presumably implies that this restriction reduces the engine power output at altitudes in excess of 25,000ft. to 30,000ft. relative to that which would be obtained if the same engine were fitted with direct petrol-injection equipment. As a result of tests made on the Merlin supercharger it has been established that introducing fuel before the supercharger eye increases the pressure rise through the blower by 12 per cent.

There is, however, of necessity a small pressure loss in the carburettor, but with modern low-velocity carburettors



The Jumo 211 injection equipment comprises 1,576 parts. This picture shows one pump dismantled.

THE CASE FOR THE CARBURETTOR (Continued)

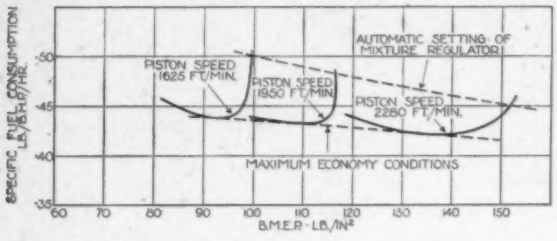


Fig. 1. Rolls-Royce Merlin X consumption loops. Fuel 87 octane. Supercharger in low gear.

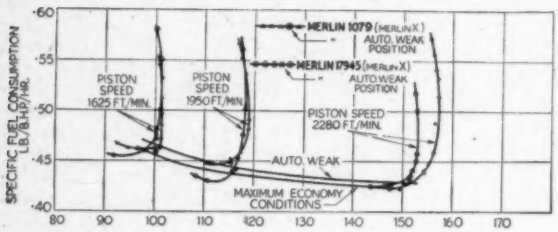


Fig. 2. Junkers Jumo 211D. consumption loops. Fuel 92 octane. Supercharger in low gear.

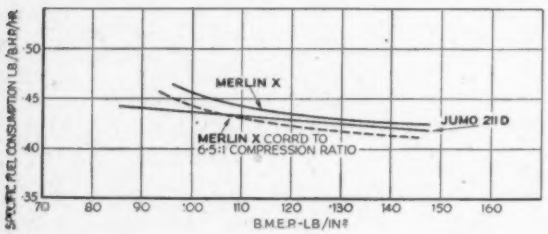


Fig. 3. Comparative fuel consumptions of Rolls-Royce Merlin X and Junkers Jumo 211D. in M.S. ratio. Consumptions represent maximum economy conditions. Fuel control manually operated on both engines.

this is reduced to about 3 per cent. of the pressure rise through the supercharger under maximum output conditions. Thus, the suction carburettor system shows a net gain in pressure rise of 9 per cent. over that which could be obtained by compressing air only, as in the case of the German engines.

In actual fact, from the figures obtained at the Royal Aircraft Establishment on the Junkers engines tested there, it appears that the pressure rise through the Merlin supercharger at the same impeller tip speed as the Junkers is considerably greater than 9 per cent., but this we attribute to the superiority of the Merlin supercharger.

The 9 per cent. increase in pressure rise can, of course, be interpreted in terms of increased power or full-throttle altitude; but in order to do this a specific performance must be taken. It is sufficient for our purpose, however, to demonstrate that engines with suction-carburettor feed give a greater boost pressure than the corresponding petrol injection engines, despite the restriction of the chokes. No allowance has been made for the power required to drive the injection pumps.

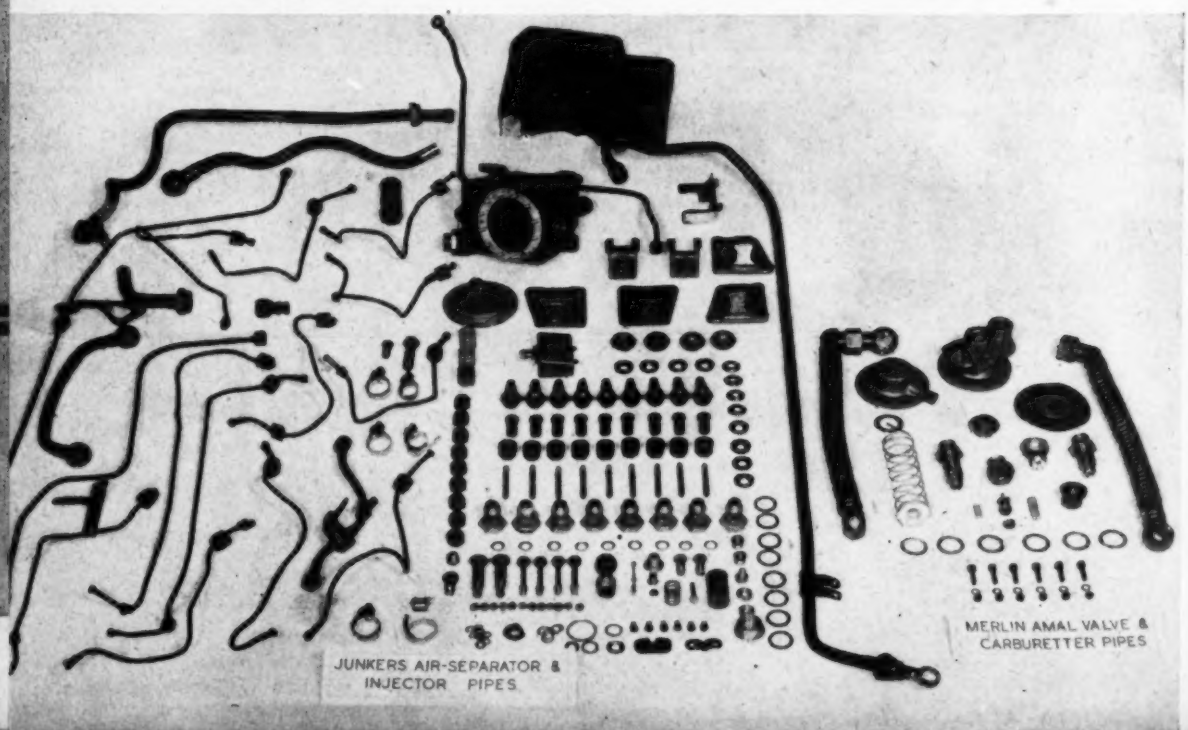
As a matter of interest, it should be remembered that the world's altitude record for aircraft with spark-ignition engines has always been held by an engine fitted with a carburettor. At present it stands at 56,046ft. The engine in this case was the Italian Piaggio 11RC. This engine owes much to the Bristol "Pegasus," which was the previous holder at 54,000ft.

Fig. 5 shows the power available in level flight for the Jumo 211D. and the Merlin X engines at their respective maximum r.p.m. The Jumo powers were those actually measured on two engines tested at the Royal Aircraft Establishment. The Merlin powers are taken from the officially approved performance figures for the Merlin X.

General Comments

The use of direct fuel injection involves a considerably more complicated fuel system than the carburettor engine requires. The fuel from the aircraft tanks is fed to the

(Below) On the left are seen the component parts of the Junkers air separator and injection nozzles and pipes. On the right the component parts of Merlin Amal valve and carburettor pipes.



THE CASE FOR THE CARBURETTOR (Continued)

injection pump units by an engine-driven supply pump. The delivery pressure of this supply pump, on the German engines, is three or four times as high as the normal delivery pressure required by the carburettor. Maintaining this high-delivery pressure at great altitudes must involve its own problems. The fuel from the supply pump has to pass through an efficient air separator before it can be fed to the injection pump. No air separator is required by the carburettor. The total weight of the Junkers engine fuel system, excluding the engine-driven supply pump, is approximately 60 lb. The Merlin X carburettor, including Amal valve and fuel pipes, weighs only 25 lb. Direct-injection equipment for a 24-cylinder engine would be double the weight of the 12-cylinder equipment, but there is no reason why a carburettor for a 24-cylinder engine should be double the weight of a similar 12-cylinder type.

The Question of Cost

It is difficult to estimate the probable cost of a 12-cylinder injection pump, since the standard of workmanship and finish of many of the parts is of necessity so high. The fuel-metering accuracy of the injection pump depends on the accuracy of finish of such parts as the pump barrels and plungers, which are lapped together and are not interchangeable. It is considered that a conservative estimate of cost, both in cash and man-hours, would be six to eight times as great as the equivalent carburettor, and this again would be doubled for a 24-cylinder engine.

As a matter of interest, it has been found that the Jumo injection equipment comprises some 1,576 parts, of which 327 are different. The Merlin X carburettor, including the Amal valve and fuel pipes, consists of only 433 parts, of which 141 are different. Once more the 24-cylinder engine would double the figure of 1,576 for the injection pump, whereas the corresponding carburettor need not necessarily involve any more parts.

Apart from the fact that fuel injection pumps are complicated mechanical accessories, the very fact that they are mechanical introduces a potential source of failure, which is not present with a carburettor of the type used on the Merlin engine. Fuel filtration is also of very great importance on petrol injection engines, since the finest particles of grit could easily result in a seized pump plunger. Safety devices are built into the injection pumps to guard against wrecking the complete unit in the event of a plunger seizing, but the result is that the corresponding engine cylinder goes out completely.

Another aspect of the mechanical injection pump is that it may possibly limit the rotational speed of the engine. The plungers are lifted by a cam and are returned by a spring, the mechanism being very similar to a normal valve tappet. The profile of the cam is such that a very quick lift is obtained, and it is probable that at high speeds the plunger might not follow the cam accurately. In this respect it may be noted that the diving r.p.m. of the Jumo 211D. engine is limited to 2,400, whereas the Merlin is cleared for 3 600.

Servicing of injection pumps would require skilled personnel and special equipment, and it is unlikely that it could be done "in the field."

A photograph of a dismantled Junkers injection pump is attached and, for comparison, a photograph of the Merlin X carburettor components. In addition, there is a photograph of the parts of the Junkers air separator, injection pipes and nozzles. The right-hand side of this photograph shows also the Merlin Amal valve and fuel pipes.

Conclusions

It is probable that some simplification of controls might result from the use of fuel injection pumps in place of carburettors, but this simplification seems out of all proportion to the considerably increased complication of the complete system

No greater fuel economy is shown, and it is not considered that production-engine fuel consumptions could be held to any closer limits than carburettor engines work to.

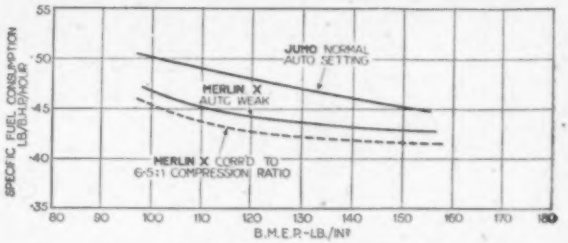


Fig. 4. Comparative fuel consumptions of Rolls-Royce Merlin X and Junkers Jumo 211D. in M.S. ratio. Consumptions represent actual automatic fuel settings.

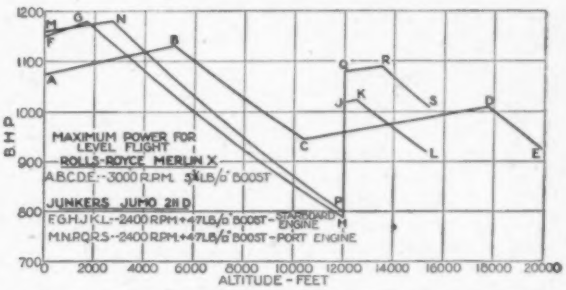


Fig. 5. Rolls-Royce Merlin X and Jumo 211D. power available in level flight at maximum r.p.m. at altitudes. Merlin X capacity, 27 litres; Jumo 211D. capacity, 35 litres. (All calculations are in accordance with A.P. 840—Brook's formulæ.)

In this respect it is noted from a maker's technical catalogue for the Daimler-Benz 601 Series engines, which also employ direct fuel injection, that production-engine economical consumption limits are quoted with a +5 per cent. tolerance. This is a normal tolerance for carburettor engines.

It is probable that good distribution of the air to the individual cylinders of the engine is of more importance in obtaining low fuel consumptions than any slight improvement in fuel distribution which might, or might not, be obtained with the injection pump. Injection pumps have no control over the air distribution, and with fully supercharged carburettor engines it is known that the fuel distribution is very good.

87 Octane Fuels Used

The claim that rather lower-grade fuels can be used with injection engines is not substantiated by the analysis of samples of German fuel, which indicated that it is somewhat better than our 87 octane fuel.

Other claims often put forward in support of direct petrol injection are immunity from freezing and cutting-out during aerobatics. With suitable heating there is no fundamental reason why carburettors cannot be made immune from freezing, and cutting-out troubles during aerobatics can be overcome by careful design of the carburettor.

The use of induction pipe flame dampers obviates the risk of fire which used to be associated with carburettors and not with injection pumps.

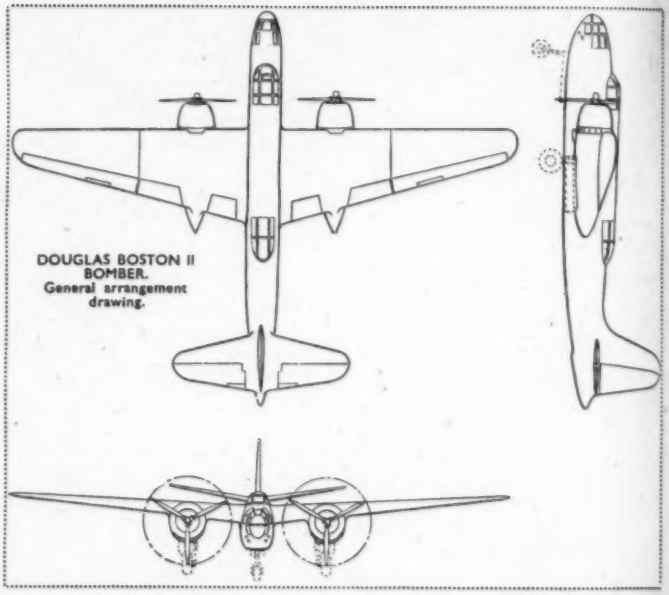
A careful examination of the merits of both carburettors and injection pumps indicates that nothing would be gained, at least on conventional types of engines, by the use of injection pumps, and the carburettor has the advantage of simplicity, relatively low cost and ease of manufacture and maintenance.

[*The arguments in favour of the retention of the carburettor, and the comparison with the injection equipment, are very ably put by the author, who is a member of the Rolls-Royce technical staff, and we are very glad to publish the article. At the same time, we would point out that the views expressed are by no means shared universally. No less an authority than M. Massuger, of the French Hispano-Suiza company, has voted in favour of direct injection.*—ED.]

TRICYCLE ATTACK BOMBER

A Legacy from the Armée de l'Air to the R.A.F.

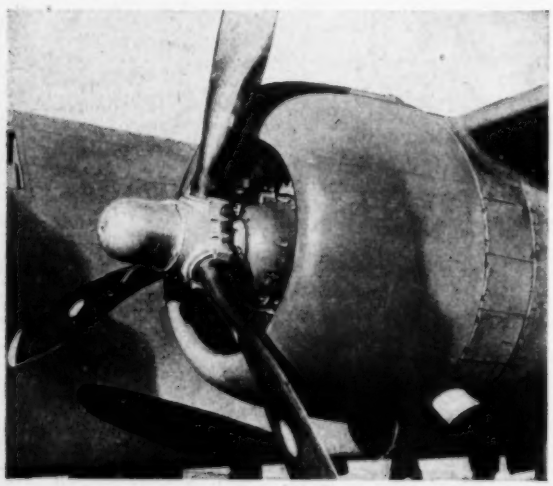
IN A CLIMB : A flying view of the Boston showing the undercarriage retracted and engine cooling gills extended.



DOUGLAS BOSTON II BOMBER. General arrangement drawing.

WE have to be very thankful for the imagination of the French when we see the rows of Douglas Boston IIs now in service in this country. The R.A.F., of all three Services, is the least likely to refuse a weapon on account of its originality, but even that great Service took an unconscionably long time to make up its mind to purchase monoplanes. Tricycle undercarriages might have proved an equal stumbling block. However, whether they would or would not is of no account now, since the type is already gracing the tarmacs of some of our aerodromes.

It is a good-looking aeroplane, and the unorthodox tail-up stance while at rest one soon gets used to. Doubtless its proportions have a great deal to do with this appearance of "rightness"; the span is 61ft. 4in., the length 47ft., and the height 15ft. 10in. The normal crew carried is three—pilot, navigator and wireless operator/rear gunner. It is somewhat of a snag that there is no communicating passage between the rear gunner and the remainder of the crew, but this is brought about by the deep bomb bay which occupies the central portion of the body to keep the bomb load as close as possible to the centre of gravity.



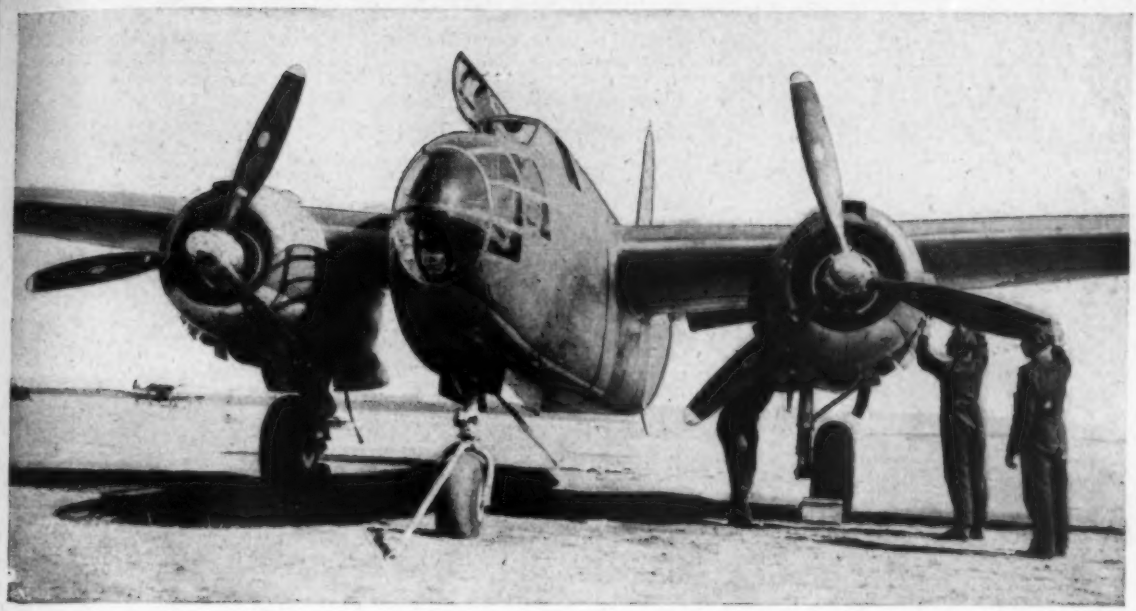
"Flight" photograph.

The pilot's and navigator's "offices" are equal to our Hampden in the matter of visibility and "lightness," although the bomb-aimer's optical flat appears a trifle on the small side when compared with our standard practice. Ingress to the two front positions is either by the hinged cover over the pilot's cockpit or by an ingenious hinged trap-door in the floor of the bomb-aimer's compartment. Both of these doors have quick-release jettison arrangements in order that they can be used as escape hatches.

Power and Wing Loadings

Performance of the Boston II is not given officially by the Ministry of Aircraft Production, but when originally ordered by the French it was undoubtedly the fastest bomber extant. Various reports give it a top speed of 320 m.p.h. at 7,000ft., while a maximum speed as high as 350 m.p.h. has been mentioned in a number of places. Cruising speed is in the neighbourhood of 280 m.p.h., and cruising range is 1,500 miles in still air. The power plants are two Pratt and Whitney Twin Wasp air-cooled radial engines, each giving 1,050 h.p. at 2,700 r.p.m. for take-off and a cruising rating of

POWER PLANT : The housings for the hydromatic airscrew and the reduction gear of the Pratt and Whitney Twin Wasp are clearly shown in this photograph. It also emphasises the underslung position of the engine in relation to the main wing.



LAYOUT : This three-quarter front view of the Douglas shows the high-midwing arrangement, the engine air intakes and oil-coolers and the optically flat panel in the bomb-aimer's compartment.

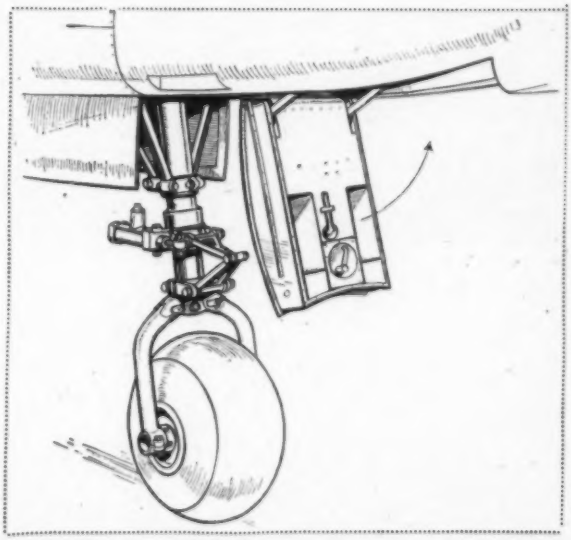
650 h.p. at 2,250 r.p.m. at 15,500ft. A service ceiling of 17,000ft. can be maintained on one engine alone by making the fullest use of the fully feathering Hamilton hydromatic constant-speed airscrews. Wing area is 465 sq. ft., and gross weight a shade over 15,000 lb. This gives a wing loading of 32.3 lb. per sq. ft.—quite low for military aircraft in these days—and a power loading of 8.35 lb. per h.p. Some 325 gallons of petrol and 30 gallons of oil are included in the useful load of 3,630 lb.

Armament

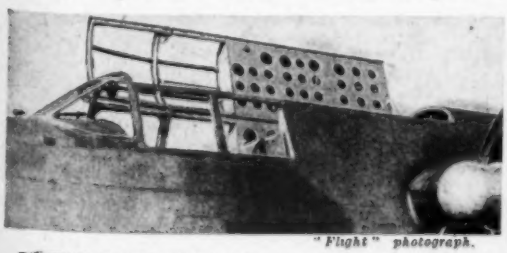
The fuselage and all fixed surfaces are of stressed skin, all-metal construction, and are, of course, in the modern cantilever fashion. Rudder, elevators and ailerons are fabric-covered metal skeletons. Split flaps are fitted to the trailing edge of the wing, their span corresponding roughly to the diameter of the airscrew.

The tricycle undercarriage arrangement gives excellent landing characteristics; in fact, pilots declare they can almost fly the Boston straight into the ground and then slam the brakes hard on. As ordered by the French, the armament was to have been made up of four 0.5m. fixed machine-guns in the nose and two free 0.303in. machine-guns for rear defence. Whether this will be altered or increased is not revealed.

How many of these Bostons have we got? How

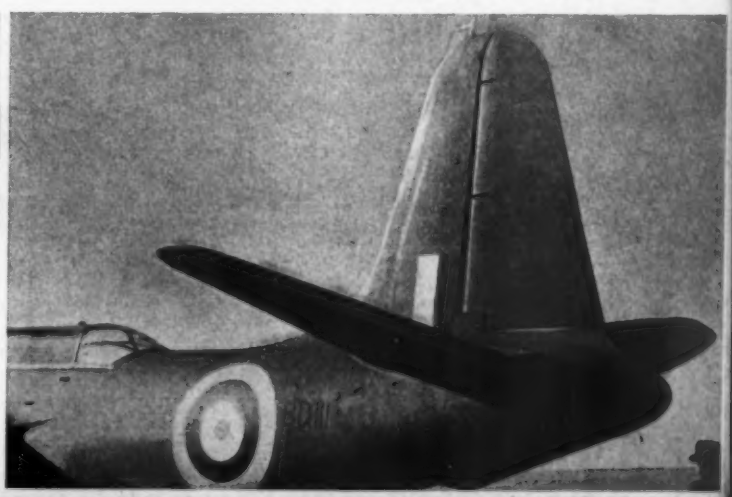


FRONT LEG AND FRONT DOOR : A *Flight* copyright sketch showing the third leg of the undercarriage and the hinged door to the bomb-aimer's cockpit. The recesses each side of the door handles form footholes and operation of the rear handle (with the safety bar across) jettisons the whole door.



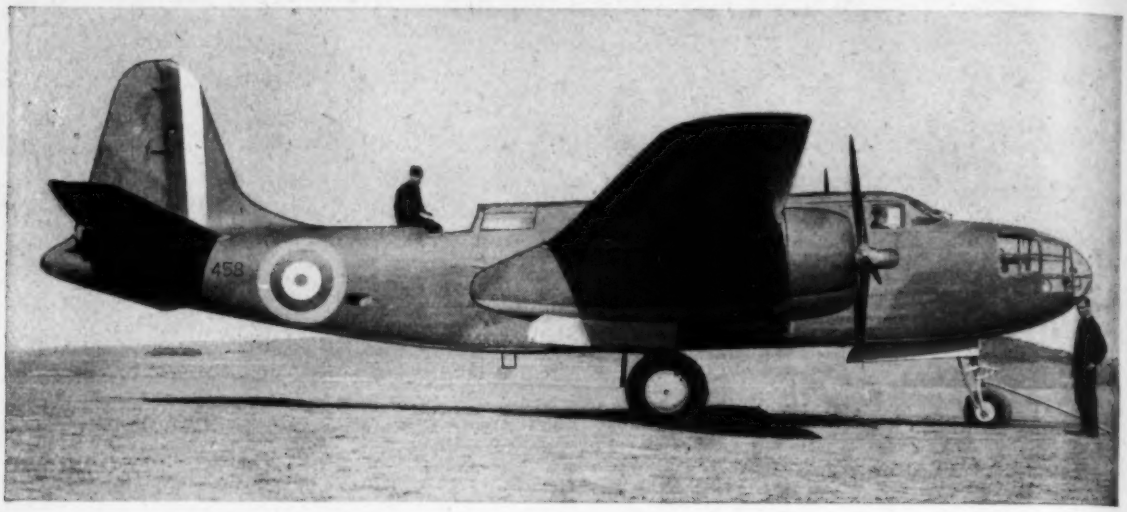
"*Flight*" *photograph.*

ENTRANCE AND EXIT : In an emergency the hinged covering over the pilot's cockpit can also be jettisoned.

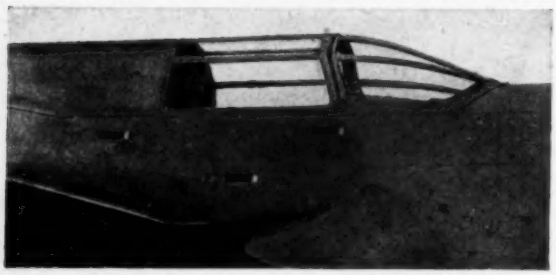


TAIL END : Boston's tail surfaces. The elevators and fins are fabric covered. The dihedral is very noticeable. "*Flight*" *photograph.*

TRICYCLE ATTACK BOMBER (Continued)



WELL PROPORTIONED : Seen in side elevation the Boston is a good-looking, if unorthodox, aeroplane.



"Flight" photograph.

CLOSED DOWN : (Left) The streamlined covering over the rear gunner's cockpit in the closed position.

many are we going to get? All that may be said is that as long ago as March, 1940, the Douglas Company was telling the world that orders in hand for this type alone, for France, Great Britain and for a slightly modified model for the U.S. Army Air Corps totalled no less than 75,000,000 dollars.

BOOK REVIEWS

Mercy and Murder. By Reginald Cartwright. Iliffe and Sons; 1s. 6d.

READERS of *The Autocar* will have read many, if not all, of Mr. Cartwright's despatches from Finland, Norway and France, where he led a Franco-American ambulance-convoy during the thick of the fighting and during the last fatal days which ended in the collapse of France. This series of 17 despatches, published in a series of articles, have now been produced in book form under the title of *Mercy and Murder*, and the whole of the profits are to go to the Red Cross Fund. The author, who is an American citizen married to an English lady holding high rank in the W.A.A.F., writes with vigorous directness not only of his own and his co-drivers' experiences, but of the popular reactions to the causes leading to civil collapse in each country. The worst tragedy was Finland, he says, because here the heroic resistance of a simple, clean-living people was rendered useless when Sweden would not allow help to reach them. Norway's tragedy was partly her own fault through internal treachery, and France was brought to ruin by her own politicians. His description of, and comments upon, such things as the deliberate bombing and machine-gunning of the Red Cross by the Russian airmen, examples of maltreatment of Norwegian women by German soldiers and the appalling confusion when the French populace stampeded south-west makes some of the most poignant and dramatic reading the present European turmoil has yet produced.

"Half the Homeric deeds of the R.A.F. fail to get into print," he says, referring to the desperate risks taken by British pilots in their efforts to help their disintegrating ally, and he describes at first hand how, on one occasion, six British bombers successfully delivered to a French unit sorely-needed supplies of "essence." They landed on an impossible "aerodrome" while escorting fighters protected them from above. They got away again, too, but the take-off was so fine a thing that at least one of them carried aloft trailing vines from the adjacent vineyard it could barely clear. It is very fitting that the Red Cross should benefit by these graphically recounted adventures of one who has already served it so actively in the field.

"Deeds that Held the Empire by Air." By Air Commodore L. E. O. Charlton, C.B., C.M.G., D.S.O. (John Murray, 7s. 6d.)

ONE is a little doubtful whether this book is intended for boys or for grown-ups. It is one of a series of "Deeds that Held the Empire," and it must have rather puzzled the author to fit his stories in under this title. He seems to have decided to disregard the implications of the title, which was probably the only thing he could do, and tell the tales of a series of notable flights, such as the first crossings of the Atlantic and the Pacific, the flight over Mount Everest, and the like. At the end there is a section dealing with the war in the air up to the date when the copy went to press, which was before the collapse of France. It is always a difficult matter to write a book about a war while the fighting still continues, and it is best to judge this book by its earlier chapters.

On the whole, the incidents described are well selected and are graphically written up, though not with irritatingly meticulous accuracy in all details. The writer's style is breezy and popular, though at times it shows evidence of haste, and we cannot approve the sentence on page 197 which runs: ". . . the Somaliland Camel Corps which had been at odds with the Mad Mullah and his following on frequent occasions, and had much to acquit that doughty leader of."

Air Strategy—XLIII

MIDDLE EAST DEFENSIVE

Lessons of the Tactical Employment of Fighters and Bombers in the Present War—VI

By CAPTAIN NORMAN MACMILLAN, M.C., A.F.C.

THE British have made a speciality of military operations in two parts of the world—the area called the Middle East and the North-West Frontier—and both have for long been the principal training grounds for the British Army. Since 1916, or thereabouts, the Middle East has also served as a wide operational area for the training of the Royal Air Force on lines which approached more closely to active service conditions than was the case at home in the United Kingdom. And since 1935, when the Italo-Abyssinian war began, training in that area has been accelerated.

The whole of the Middle East area lends itself admirably to the exploitation of the qualities inherent in aircraft. Distances are great, railways and roads few, barren ground occurs everywhere outside the Nile valley, and over it the aeroplane can pass with ease. The artifice of camouflage is not easily effected in desert areas. On the sand small groups of men are as readily picked out as are ships at sea from aircraft flying over them. Thus reconnaissance from the air is of greater value over desert territory than almost anywhere else.

In some ways warfare over the Middle East area is simplified by the very limitations of the territory. Man must cling to the essentials of existence, and nowhere can he live long without water. He must have communications, and for that reason in wild country he tends to settle near rivers or the sea, for it is easier to build a boat than a road. Thus the habitable areas of the Middle East are well defined, and the military commander knows just where he must apply his strategy and where there is no point in doing so.

A Reversal of Method

How different are the conditions in Western Europe, where railway lines and roads are multiplied, where bridges across rivers are numerous, and where an attacking foe can choose his line of approach secretly and keep his enemy guessing as to his intentions. In the Middle East the commander of forces is not given this latitude. His strategy must conform to the conditions under which his forces have to operate.

This is important, for it means that bluff is difficult as to intentions in regard to direction of attack. The strategy of bluff must, therefore, be confined to the timing of a stroke and to the tactical methods which will be employed in making the stroke when the moment comes to strike. So, in Middle East warfare, tactics become of greater importance than strategy, and the tactical handling of a force is the essence of strategy.

In this respect and in such territory the British excel. German generals have little experience in this kind of warfare, and the experience possessed by Italian generals has been gained in the face of native races and not against a Western European Power.

Someone said to me the other day that he thought that "Field-Marshal" Hitler was Britain's best general, because it would be out of his mistakes that we would profit most; he, Hitler, would win the war for us. Well, that thesis is true enough. It is not the excellence of one general which decides the battle, but the relative qualities of the opposing generals.

It does seem to me that Hitler has made some miscalculations in this war. I believe he was wrong to strike in the west before he went south-east through the Balkans. I believe he was wrong, too, in not being prepared to strike at the United Kingdom simultaneously with his stroke against Holland, Belgium and France. Had he been prepared to go for us before the evacuation from Dunkirk the war might have taken on a woefully different aspect from that which it wears to-day—for us.

Similarly, Mussolini made his great mistake when he waited to enter the war when he did. Or perhaps that was Hitler's mistake, also. It is scarcely to be doubted that if the Italian armies could have made an attack against us in the Middle East area in 1939 we would have fared less well, even allowing for all the deficiencies in Italian militarism which have since been exposed. Undoubtedly it was the position of the French in Northern Africa which prevented such a move by the Italians, and for that we have to thank the French.

Tactical Exercises

During those wearisome months of 1939 and 1940, between the collapse of Poland and the attack on Norway, our squadrons in the Middle East had the opportunity to practise tactical exercises on a war footing which were little difierent from the war operations which were to follow.

If there is one part of the world in which air warfare cannot hope to be decisive, it is the Middle East. It requires an army to gain a decision there. Strategic bombing, as it has been practised by Germany in Western Europe, cannot hope to achieve results in and around the southern and eastern areas of the Mediterranean. To obtain the results desired by the general who is to be victorious it is essential to employ the aircraft at his disposal for direct military operations. The aeroplane in that area becomes a military weapon and must be employed as such. It must fit into the general military plan and be subservient to ground requirements.

Air operations of this nature began in the days of Allenby, and there is little difference in their mode of employment to-day. Their task is to obtain air superiority and follow this up with co-operative attacks against the enemy ground forces in alignment with the tactical situation existing at any given moment. Nevertheless, there is good reason to possess a strategic bombing command in the Middle East in addition to the air forces allocated to direct army duty. For the Middle East is a useful centre, and a mobile bombing command stationed there which could be moved to any theatre of war where its services were required would not deplete the army aircraft as, apparently, it was depleted by the necessity to despatch air reinforcements to Greece when that country was attacked by Italy.

Air Bases Not Endangered

During the course of the period which I have called the Middle East defensive British forces were withdrawn before the advancing Italian armies, slightly in the Sudan and Kenya, completely in Somaliland, and considerably in Egypt. From the angle of air operations the important feature of these withdrawals (which undoubtedly used up some of the Italian power of momentum) was that in no case did they jeopardise the main air bases of the Royal Air Force in the Middle East. In no way did they diminish the power of the air arm to maintain its pressure on the Italian forces, and to organise in preparation for a counter offensive.

Compared with the advance of the German armies in every theatre of war in which they have struck, the Italian strategy was weak. The Italian generals made the fundamental mistake of failing to bring the British forces to battle. They captured no base. Even by taking all British Somaliland they acquired a land which is one of the most

THE MIDDLE EAST DEFENSIVE (Continued)

barren in the British Empire, and there they met the sea and were halted by the physical features of the country.

The stretched-out line of the Italian forces along the coast of North Africa from Sollum, on what was the frontier between Egypt and Libya, to Sidi Barrani was of no value to them. I have flown over that arid area and I cannot understand why the Italian generals permitted their troops to stop where they did, right out in the blue of the desert shore, having achieved nothing worthwhile by their advance. The only solution that offers is the procrastination of the southern Latin races, the spirit of *dopo domani*, there is always a to-morrow.

The loss of that piece of coastline mattered little to the British forces. It possessed no harbour of naval importance. It did not affect the efficiency of the Royal Air Force units in Egypt. It did not increase the efficiency of the Italian air force in action. It did not cut the line of communications between the United Kingdom and Egypt. And it lengthened the Italian army line of communication and must have made the supply problem one of considerable difficulty.

The strategic strength of Egypt lay in the distance which the Italian forces had to cover before they could capture a base of importance—Alexandria. Even had they secured Alexandria as a base, they would still have been faced with the tremendous problem of supply, for they would have been unable to use ships against the sea power of the British navy in the Mediterranean, and the overland route would have been a way of toil and sweat and, against the operations of Royal Air Force squadrons, death as well. The one thing the Italian operations did was to draw a considerable proportion of British Imperial strength into that area, and for that Hitler has thanked his partner; but for that sole advantage Hitler failed to profit. And that is why, I believe, as I said at the beginning of this article, that the fundamental blunder in Hitlerian strategy in this war was in coming west before he had settled the problem of south-eastern Europe.

The Axis Gave Us Time

During the period of the war which preceded the beginning of the British sweep forward in the Western Desert, and until the entry of Italy into the war on June 10th, 1940, the Royal Air Force squadrons in the Middle East were really functioning on a mobilised training basis. There was ample time to make all the necessary dispositions and to bring up units of the South African Air Force into Kenya. In an area in which the British are supremely practised in the art of warfare the Axis gave us time.

After Italy entered the war there began the period of strategic bombing of Italian bases and aerodromes. How different things were from the period of the Italo-Abyssinian crisis, when British squadrons equipped with old-fashioned biplanes of short range were standing by to bomb bases in Eritrea if war had come then. For in those days the aeroplanes we had in the Middle East had not the range to reach their targets and get back to their aerodromes of departure. Many of them would have been forced to fly on down the Red Sea in the hope of making somewhere in British territory; probably many would have been lost in their first raid, and a more inhospitable bit of coastline on which to alight can scarcely be imagined. At sea, coral reefs and sharks. A pleasant prospect!

How everything has changed in those few years. Aeroplane range (not even of the newest types) has gone up three times. It was possible to carry the bombing raids into the bases of the Italians with ease in spite of defending Italian fighters. From the start of the Italian part in the campaign their forces everywhere outside Libya were cut off, except for the flights of long-range aircraft. It was impossible for them to renew their fighters as they were shot down. And as British bombing attacks continued against the Italian base aerodromes, the losses in Italian aircraft mounted steadily. The process of attrition must have played an important part in securing for the Imperial forces in East Africa the mastery of the air.

The Power of Air War

In that widespread area of the Middle East there was presented to the world a perfect example of the power of air war. Throughout the period when the British navy could not bring the Italian ships to action, and while the British army had to stand on the defensive and make strategic withdrawals at several points, the Royal Air Force maintained its unceasing offensive. I doubt if any better example has ever been given of the fact that war in the air cannot stand still. The aeroplane is essentially an offensive weapon, even when the major policy within an area is that of strategic defence. Always the aeroplane must hit out. It possesses no power of restraint in war, as does an army or a navy, without actually going into action. An air force must fight continually. And somewhere in the mind of Mussolini or his generals there must have been a miscalculation, otherwise they would never have permitted their overseas empire to become the target for British air assaults with an ever-diminishing power of striking back or of fighting in the air in self-defence.

Unquestionably the area was an easier one to deal with in some ways, but the same tactics must apply in relation to Germany also. In Germany, as in the Middle East, we ought to devote a portion of our air strength continually to the wearing down of German air strength, for it is by that means, as much as by the building of immense air forces, that we shall bring victory to our arms in Europe.

By the time the British ground forces were ready for their spring forward along the coastline of the Western Desert, the work of the Royal Air Force in the Middle East appeared to have been well done. The armies could go forward with no doubt that air superiority would be achieved in Libya as it had been then achieved in the East African territories of the second Roman Empire. And the lesson to be derived from the history which has been made in the Middle East is that it is essential to apply air power in advance of any operation in preparation for that operation, so that local air superiority at least is gained. And that appears to apply to actions both on land and at sea.

The Norway campaign was the antithesis of that in the Middle East, and for our failure in Norway we have to thank just those very conditions which Mussolini has to thank for his failure in the Middle East. In saying this I refer to the work of the air component of the forces. The work of the mechanised forces and of the infantry, and that of the navy, fall into a category which does not come within the scope of this article. And the Royal Air Force in the Middle East, and the Dominion air forces, deserve full praise for the way in which they have executed their tactical operations throughout an area whose spaces can scarcely be realised by those who have never seen them.

(Next Week—Middle East Offensive.)

JOHN LEEMING

"We are lucky to be alive and so well treated. The people here have been very kind and we are comfortable." So says Flt. Lt. John F. Leeming, prisoner of war in Italy, in a letter to an R.A.F. colleague which reached this country a few days ago.

"We are, of course, very depressed at what has happened," his letter said, "but it might have turned out much worse. We play cards and draughts—we have made ourselves a draught board—are teaching ourselves Italian, and we walk. It is 95 paces around the garden, and it takes us 50 seconds to walk them. Yesterday we calculated we walked five miles."

Flt. Lt. Leeming, one of the founders of the Lancashire Aero Club, was taken prisoner with A.V.-M. O. T. Boyd when the aircraft in which they were flying to Egypt was forced to land in Italy.

HERE AND THERE

Exhaust Muffler

ALL the Piper models, Coupe, Cruiser and Trainer, are now fitted with a muffler to reduce the exhaust noise. The muffler is of stainless steel and is standard equipment. This is the first aeroplane to be so fitted.

E.P.T.

AT the annual general meeting of Aero Engines, Limited, Sir Maurice Bonham Carter complained that the excess profits tax offends both equity and common sense. "Take the case," he said, "of two concerns performing an identical task; one having a good profit standard receives a full reward; the other, having no profit standard, receives little reward. Yet both are performing the same service to the State."

U.S. Expansion Finance

IT is reported from America that funds for the construction of some of the new airframe and engine factories will be provided by the companies concerned and not by the Government. The Government will, however, repay the cost over a period of five years, at the end of which period the company will have the option to purchase the factory at cost less a prearranged depreciation rate, or at some negotiated price. If the company does not wish to purchase the factory, the Government will then become the owner. It is not stated what rate of interest the Government will pay the company on the capital cost of the factory during the five-year repayment period; but perhaps this is regarded as a cost to be added to the contract prices for the factory products.

The Yukon Air Trail

CANADA is to construct a chain of seven new airports linking Edmonton (Alberta) with White Horse, in the Yukon, at a cost of $9,000,000. This 1941 version of "the Yukon Trail," which is a defence measure, will be completed during the summer and will be available for use by U.S.A. military and commercial aircraft.

This project was recently announced by Mr. Power, the Canadian Air Minister, who also mentioned that a further $20,000,000 was to be spent on extensions and improvements to operational home bases of the R.C.A.F.

Intelligence Officers Wanted for R.A.F.

THE ever-growing strength of the R.A.F. has created vacancies for intelligence officers — the men who "brief" the pilots and crews before their flights and interrogate them about the success of their mission on their return.

This is regarded as one of the more important specialist jobs in the R.A.F., and requires not only special training, but special human qualities, too, and is, therefore, not every man's job. The intelligence officer must know the bomber crews as individuals, and must understand their work and sympathise with their difficulties. Tact, personality and a practical knowledge of flying and of the R.A.F. are the ideal qualities, and candidates possessing suitable qualifications will be given a short course of training in their special duties.

Prospective candidates should write to the Air Ministry Information Bureau, Adastral House, Kingsway, London, W.C.2, giving full particulars of their experience and qualifications for the job, which is open only to men between the ages of 32 and 50.

Badge and button design for the A.T.C.

A.T.C. Cap-badge

A NEWLY designed cap-badge has now been approved for the A.T.C. Made of chromium-plated white metal, it is circular in shape and the design embodies an eagle in flight—the emblem of the Royal Air Force—with the words "Air Training Corps" in the circlet. Buttons of the same metal and finish have also been approved, these having the letters "A.T.C." above the eagle, and a button-hole badge for wear with civilian clothes by members of the corps. This is a small replica of the cap-badge, and, as a precaution against possible unauthorised use, it will not be on public sale, but will be supplied to cadets only on an order from the commandant.

Beauforts in Australia

THE Australian Minister for Supply and Development, Senator McBride, announced that the first Bristol Beaufort bomber to be made in Australia will undergo its test flight before the end of April. It is indeed welcome news that the Aircraft Production Commission has got on so far with the solution of its production problems, for with the declaration of war changing all plans, difficulties have been very great. Work is going ahead with the setting up of a factory to make Pratt and Whitney Twin Wasp engines for the Beauforts, but latest news did not indicate that this had progressed so far that it could have produced engines by next April. It seems likely that the engines for the initial batch of Beauforts will come from the Pratt and Whitney factory in U.S.A.

International Air Mail

ONE effect of the war is reflected in a statement made by Pan American Airways in their application to the Civil Aeronautics Board for new rates of payment for their transatlantic service. They say that an amount of over $1,294,000 remains uncollected from foreign Governments for the transport of air mail. The company cannot deal directly with foreign Governments but does so through the U.S. Government. By July of this year Pan American Airways expects to have enough flying boats to run six return trips between U.S.A. and Europe. (It is likely that the subsequent order for three Boeing Clippers for the British Government will affect this programme.)

If these trips can be run, the company requests payment at the rate of $21,600 for each of the first two, $13,800 for the third, $9,000 for the fourth, $8,500 for the fifth and $8,000 for the sixth. For these rates the company is obliged to carry mail up to a maximum of 1,600 lb. outbound, with a rate of $4 per lb. if this weight is exceeded.

New Canadian Petrol Source

AVIATION fuel is being processed from Turner Valley crude oil for the first time at the British American oil plant at East Calgary, Canada, officials at the refinery recently announced.

The petrol, it is understood, will be made available to the Royal Air Force flying schools in the province. In the past, most of the aviation spirit used in Alberta has come from a refinery in British Columbia.

High-speed Diving

A BELL AIRACOBRA pursuit was recently dived at the tremendous speed of 620 m.p.h. by a U.S. Naval Reserve pilot from the height of 21,000 ft. By name Andrew McDonough, this pilot is employed by Eastern Air Lines on the run between Chicago and Miami. This feat surpasses the dive of 575 m.p.h. made by the Curtiss-Wright test pilot about two years ago in a Curtiss Hawk 75 for the French Army. It is a pity that some of the feats and speeds being put up by the test pilots in England at present cannot be made public.

Plastic Fuselages

TESTS of plastic fuselages now being carried out at Bendix Field, New Jersey, may radically alter Canada's programme of aircraft production. It is expected a complete fuselage will be ready for flying within 30 days. If tests prove the value of this new system of manufacture Canada will at once arrange for production in the Dominion. The test fuselages are for the Anson trainer model, the manufacture of which in Canada has been beset by difficulties.

Ralph P. Bell, director of aircraft production, visited the aircraft research laboratories at Bendix Field recently and reported a successful test of an Anson fuselage nose made of plastic materials. Two metal Anson fuselages were sent to the laboratories for use as models. If the flying tests are successful it is expected about 100 plastic fuselages will be bought there as an experimental order while plans for manufacture in Canada are being completed. This type of fuselage is much lighter than the metal fuselages now in use, is quicker to make, and the cost is said to be about one-third of the metal type. Fittings will have to be altered for attachment to wood or plastic instead of the metal tubing for which they are now designed.

Difficulties in getting the Anson into production are now being "ironed out." Changes of design were necessary when it became impossible last year for the engines to be provided by the United Kingdom, and there have been subsequent engineering changes which delayed the work.

Correspondence

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

THE OBSERVER CORPS

Rate of Pay Criticised

THE trouble with the Observer Corps is that its members are too highly paid. With remuneration at the rate of 1s. 3d. an hour for both whole- and part-time members and a "guarantee" of a 48-hour week to the former, it is little wonder there is no room in the Corps for those of us who would willingly give our services free, or for the purely nominal pay of a Home Guard. Nor need we wonder that the war expenditure of this country is reaching "astronomical" proportions.

OBSERVING ENQUIRER.

COMBATING NIGHT BOMBERS

A.A. Shells to Release Flares?

THERE seems to have been some controversy by several correspondents of *Flight* as to how to intercept and attack enemy aircraft. One of your correspondents advocates fighter aircraft dropping flares above the E.A. and then attacking it. That sounds O.K. in theory, but if I were a Jerry pilot flying a 300 m.p.h. aeroplane I'm sure I shouldn't circle round under the flare, waiting to be attacked. I should be heading for parts unknown with stick and throttles well forward. Anyway, the main thing seems to be to find the E.A. Once you have found him, you stand a chance of shooting him down, but it's not much good dropping flares all over the place just because you are reported near an E.A. A much better idea would be shells supplied to the A.A. batteries which had a solid base and a very thin casing. When the shells reached the required height the casing could be blown off by a small charge and a parachute open, supporting the heavy base, which in its turn could have a support running up through the air outlet of the chute and having a collapsible reflector on top containing the flare. The flare would not only light up the plane, but would also dazzle the pilot and prevent him from seeing his target, the advantage over Antoni Zuk's idea being that if there were a large number of E.A. over, thousands of flares could be fired up in different layers so that the enemy could not dive below them. It would be a comparatively cheap method as the parachute could be returned to the factory, fitted with a new case and flare and used again.

R. L. REEDER.

BOMB TRANSPORT

Two Engines with Single Airscrew

IN my letter published on January 2nd I expressed the opinion that some aerodynamical improvements would greatly help even in slow 'planes to increase their range. In the long-range aircraft it is obviously necessary for safety to provide two independent power plants. The 'plane must be able to continue the flight with one engine stopped, with partially reduced load. As in such conditions the side thrust has to be kept as small as possible, I praised the "Skyrocket" solution, where, by shortening the fuselage nose behind the airscrew discs, the engine nacelles were brought closer together. Of course, still better results would be obtained by bringing both engines into the fuselage, but as yet the proposed solutions involve heavy and complicated two side-airscrew propulsion.

I want to suggest now to drive one propeller by means of two independent power plants. If we could throw aside the supercharger in the Merlin (following the German practice) it would be possible to use a double Merlin formed by two engines placed one behind another. Each of both reduction gears would have a built-in free-wheel device. The common airscrew, placed on the secondary shaft of the first engine gear, would be connected with the second by means of a long shaft—being the secondary shaft of the second engine—lying between the blocks of the front engine in the place where, in motor cannons, the cannon is placed. If one of the engines is stopped it is automatically declutched by the free-wheel, and a single-engine flight begins, the c.s. propeller changing only the pitch. It would be far easier to adapt this device to the Allison W engine because all the change wanted would be to build-in the free-wheels into the primary pinions of the reduction gear. This latter engine would be more suitable for fighters, as the length of the Double Merlin seems to interfere seriously with the central position of the pilot. The D.M. could serve advantageously in the heavy bombers to change four-engined 'planes into apparently twin-engined. The long nacelles and a shortened fuselage nose can then produce in night or accompanied bombers the "Skyrocket" qualities. The load carrying capacity in TM would easily equal the power (h.p.) of such a 'plane.

A. B. GALUSZKA.

SO NEAR AND YET— !

Red Tape Unravels Slowly

I READ with interest a letter in the February 6th issue of *Flight* under the nom de plume of "Disgruntled."

I also am in a drawing office, doing "routine work of semi-technical character," and also, like "Disgruntled," I was very desirous of joining the Services.

I managed to take the matter a step further by obtaining a letter of release from my employers. On the 29th of October, 1940, I was passed by the R.A.F. selection and medical boards as a suitable person to become a pilot. I was then told that it took two months for my name to be taken off the reserved occupations list. So I was sent back to my "routine work." Why it should take two months, I have not the slightest idea. I was prepared to wait for the two months, but it is now almost four months since I was accepted by the R.A.F., and while the Air Ministry continues to advertise for volunteers for flying duties, I am still doing the monotonous tasks which "Disgruntled" truthfully states "could be equally well performed by the medically unfit or the older men."

So you see, "Disgruntled," even if you do obtain a letter of release, you are still tied down by the famous "red tape."

VERY DISGRUNTLED.

THE NIGHT FIGHTER

Readers' Views of P.B.'s Book

I HAVE just had two hours' entertainment with Mr. Pemberton Billing's book. I realise that he is a man of outstanding energy and ability, and the long record of fulfilled prophecies certainly qualify him as an expert in the *last* war. But I doubt whether he has been sufficiently in touch with modern operational difficulties or possibilities, and it is not surprising that an Air Ministry he cynically hopes the Germans will bomb (p. 71) should reject his schemes.

In dealing with the defence of this country by night, he drifts at once from the primary requirement of *finding the enemy in the dark* to relegate this obvious need to fourth place in a list of limitations, of which *duration* appears to him to be all-important. After some quite illogical reasoning (in which it is decided that a night-fighter should be capable of staying up all night), the book never looks back, and we gaze open-mouthed as the ingenuity is piled, page by page, on to a totally false premise—like an enormous pyramid mounted *upside down* on, say, the dome of St. Paul's.

Among the other enormities is the revolutionary and dangerous suggestion that the black-out is unnecessary. Any light, other than a searchlight, is a friend to the night-flying pilot—ask him ! And I am pretty certain that an illuminated street in London would come to a very swift and terrible end. The remark of Mr. Harry Tate in one of his unforgettable wartime records was short and true, "No lights—no Zeppelins !" Then there are the airy discussions of the tow-fighter, which it is obviously necessary to describe in "slightly greater detail"—the latter being "light-metal jaws which open to four feet," and "coupling up in mid-air at night." I can imagine the relish with which night-flying pilots would view being towed along on a dark night like sledges, each one trying to avoid the others' slipstreams while flying on the Sperry !

Mr. Pemberton Billing guessed he would be attacked by "ignorant criticisms." He may call mine destructive as well. But I can assure him that the present methods (of which he does not appear to be fully informed) used in night-defence are *all now contributing* to the total proportion of raiders destroyed, and that as each method is improved and developed so the total will rise to a figure really discouraging to the enemy.

I. B. SELWAY

GOOD TEAM WORK

Many of These Personalities Were Mentioned in the Fairey History in Our February 20th Issue

ONE SECTION OF THE FAIREY EXECUTIVE STAFF: Back row (left to right): C. C. Perrins, J. C. Macpherson, H. H. Chennell, E. C. Garrard, J. S. Charnley, C. F. Hodson, W. E. Cooper. Middle row (left to right): F. H. Dixon, H. G. Sawyer, H. T. Wood-Smith, G. Lyon, A. C. Brown, F. Bolton, M. S. Hooper, P. Morrey. Front row (left to right): C. S. Staniland, G. E. Toms, W. Walmsley, A. C. Barlow, G. W. Hall, F. C. Bray and A. G. Forsyth.

AND ANOTHER: Back row (left to right): A. Calder, F. Hockley, L. Pearce, S. Moseley, A. Vines, J. Grimes, L. Richards. Front row (left to right): F. H. Ordidge, S. Hewitt, R. McNeillie, S. G. Custance and S. G. Sleeman.

OVERFLOW MEETING: Members of the Fairey executive staff who could not be present to be photographed in the groups. (Left to right) Richard Fairey, Jun., B. G. Slater, E. O. Tips, H. E. Chaplin, C. G. Dunsford, V. G. Wilson, D. Menzies, and R. T. Youngman.

TOPICS OF THE DAY

A QUESTION OF TEMPERAMENT

"Indicator" Changes His Mind About Medical Boards, Red Tape and Kindred Matters

AT a very conservative estimate there are probably at least ten thousand people in this country who have their reasons for thinking that the age and medical standards for entry into the R.A.F. are far too stringent. Some of them have been turned down without an interview on the score either of age or general unsuitability, while others have been through the mill at the Central Medical Establishment and have afterwards received one of those nasty little standard letters explaining with specious regret that their application cannot be further considered.

There was a time when I joined whole-heartedly in the ten thousand shrieks of condemnation, and I still think that the C.M.E. is too hidebound. In order to be quite sure, the experts there let a few people through their fingers who would probably make the best of all fighting pilots, while passing others who may be mentally unsuitable for any kind of flying. But, as in all Civil and other Service departments, rules must be made and kept, otherwise there would be the most appalling muddle.

It is all rather like the much-advertised red tape which, despite the cries of the know-alls, is entirely essential in running a business with half a million employees and with property worth a few hundred millions. One can laugh at the hundreds of forms used, for instance, in the R.A.F., each with its own little number, but it would be impossible to keep track of all the people and things without them. And, furthermore, it is much simpler to ask that Form 45678 should be "raised" than to demand the form "which deals with the reimbursement of pay to L.A.C.s who have asked to be re-mustered . . . you know—the form with the pink edge and the four columns on the back to be signed by the A.O. No, no, not *that*. . . . I'd better come over and look for it myself." (All forms, persons and situations mentioned in this paragraph are fictitious and have no connection with forms, persons and situations whether living or dead.)

A Discovery

To return to the Medical Board business. My slight change of front in the matter has nothing to do with my less intolerant view of rules, forms and ceremonies, but simply that I have regretfully discovered that, in general, the older man and the man who is not fighting fit in every respect simply cannot live with the youngsters when it comes to the point, either in air fighting or in long-distance bad-weather flight with a job to do at the end of it—and a job which requires all the courage and initiative available.

This "discovery"—made by so much more experienced men long ago—has been the result of watching my own and other people's reactions to hard and violent work in the air, and the regret is mentioned because I am one of the older men alluded to. I should rather have liked to have had a shot at something before this war is over, but there it is.

Dealing with my own reactions, I may say that the awful truth has only dawned upon me during the last month or two when I have been doing rather more than merely flying aeroplanes smoothly and quietly from place to place. Then I was bothered by weather and by the difficulties involved in flying three or four different types one after another, but one merely took off, climbed to a modest height, and set a course for the delivery point. During a maximum of a couple of hours' non-stop flying one was normally thinking about other things unless one or other of the instruments showed some unusual figure, or the weather was especially bad. I was tired, even then, at the end of the day, and did not, for instance, feel inclined to drive twenty miles in the black-out to a party—as a younger man might have done—but the awful truth did not dawn.

It dawned only a few weeks ago when, for half an hour, I put a fighter through some quite mild paces. I felt "muzzy"—mentally rather than medically—as the machine rolled over into a dive, my ears cracked as the earth came up, and, worst of all, I pulled out too early with a greying of the landscape, because I couldn't feel sure of my judgment. And up in a steep climbing turn to repeat the performance, followed by a series of full-blooded turns and odd variations of my own invention. At the end of the half-hour I was wet through and tired—but not physically tired. That is the whole point. No doubt quite wrongly I flatter myself (we must all have a little shibboleth to keep us going) that I am reasonably fit and can climb mountains or ski all day—and nothing is so tiring as either done by a person who is expert in neither. The tiredness was the result partly of continuously changing g and atmospheric pressure, but mainly of worry. "Must be careful not to hit the ground . . . must be careful not to overdo the climbing turn and spin in . . . must be careful . . ."

Confidence

The youngster does not worry and he is absolutely certain that he can do this and that. So after half an hour's much more vigorous aerobatics in pursuit of some Messerschmitt he is ready for another, and another. . . . Nor does the youngster, whatever the job, enter his aeroplane with the feeling that "this is all rather unfortunate, not to say dangerous; why couldn't there be a nice fog to-day so that I could sit comfortably in the mess talking about Longhorns and Camels?" He views fogs, and bad weather generally, with the greatest of annoyance, and is only restrained with difficulty from attempting a blind take-off. The older pilot thanks his stars for the respite and does not go screaming around asking for Met. forecasts.

There are exceptions, of course, but the C.M.E. is not and cannot be interested in exceptions. And I may say that there are exceptions at each extreme. The average pilot of mature years may not be keen on dashing into the jaws of death, but he is usually keen on getting this war over, otherwise there would be no point in dressing up in a somewhat flattering uniform and promising to work for fourteen-and-six a day. The "other extreme" exceptions must be quietly and painlessly weeded out if we are ever to win this war. Imagine the results if everyone sat around doing as little as they possibly could and finding excuses for not doing even those things which could be done. When I think of those results I am not so sure about the civilised word "painlessly."

Nor have I gone all moral. I'm not particularly interested in the moral side of the business. We are risking our necks and skins largely to save them, and not exclusively for some ideology. We can think of ideologies when the affair is over. In the meantime it is you or the other fellow, and it is ridiculous to imagine that any job is unimportant.

Dear me. I mustn't go on like this. "INDICATOR."

An American Accident

AFTER a very excellent record of safety, the American operating company, Eastern Airlines, has sustained a severe loss in a crash near Atlanta, Georgia. It appears that the aeroplane was on its way from New York, arriving over Georgia in the early morning. Apparently there was a thick fog, and the machine crashed in a pine thicket while attempting to land. Seven of the 16 occupants were killed. Among those on board was Eddie Rickenbacker, president of Eastern Airlines. He was reported to be critically injured.

Service Aviation

Royal Air Force and Fleet Air Arm News and Announcements

£1,000 for R.A.F. Comforts Fund

PURCHASERS of the Christmas card which was sold for the benefit of the R.A.F. Comforts Fund will be pleased to learn that a cheque for £1,000 has been received by the R.A.F. Comforts Committee from the publishers of the card, Messrs. Raphael Tuck and Sons. The sum represents the entire profits on the sale of the card, rounded into four figures by the generosity of the publishers.

"In a World of Space," the painting by F. Gordon-Crosby, of *Flight*, which illustrated the Christmas card, was unfortunately destroyed in a recent "Blitz." Mr. Crosby intends to present another painting in its place.

A/C Farmer

AIRMEN of an Army Co-operation School are making a success of farming odd rough ground around their aerodrome.

Thirteen acres were ploughed up and eleven are being used for potatoes and the remainder for cabbages, peas, beans, turnips, cauliflowers, and other vegetables. Marrows are grown on odd heaps on the fringes of the 'drome. The outlay on these vegetable gardens has amounted to about £160 a year, including the cost of approximately 10 tons of potato seed, and it is hoped that a potato crop of 80 tons will be yielded this season, besides a substantial showing of cabbages and various greenstuffs. A mushroom bed is in course of construction.

Another branch of the farm which has been attended by considerable success is pig-breeding. At present they possess a herd, gaggle, pride, charm or whatnot of no less than 80 snouts.

Reared on swill from the station, with the aid of a small amount of other food, they occupy a spacious compound of sties and huts adjoining a pigs' cook-house. Sales of the pigs take place regularly, under Ministry of Food licences, in the nearest local market.

The money made on the farm is converted into Conversion Loan, which becomes the property of the P.S.I. A little farming competition between stations seems to be indicated.

Awards

THE KING has been graciously pleased to approve the following award in recognition of gallantry displayed in flying operations against the enemy:—

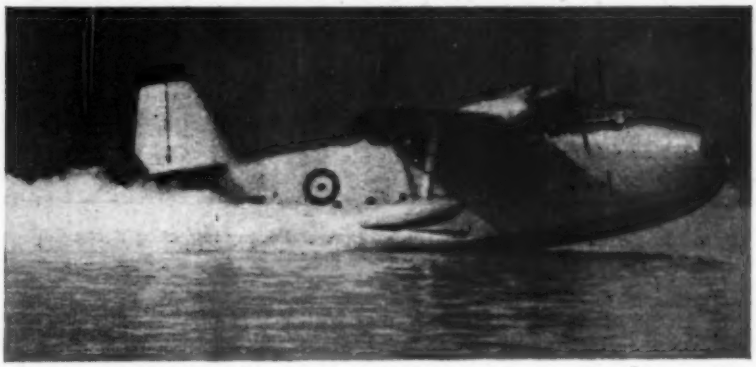
BAR TO THE DISTINGUISHED FLYING CROSS.

Act. Flt. Lt. J. C. FREEBORN, D.F.C., No. 74 Squadron.—This officer has been continuously engaged on operations since the beginning of the war. He has destroyed at least 12 enemy aircraft and damaged many more. He is a keen and courageous leader.

DISTINGUISHED FLYING CROSS.

Act. Flt. Lt. R. M. TROUSDALE, No. 255 Squadron.—Since the early months of the war, this officer has been continuously employed as a fighter pilot and his keenness and enthusiasm for operations has been most marked. He has destroyed at least four enemy aircraft, including one at night.

Act. Sqn. Ldr. J. M. N. PIKE, No. 203 Squadron.—During a period of four days in February, 1941, this officer carried out two low-flying attacks against enemy aerodromes. On the first occasion, as he arrived over the aerodrome, three enemy fighters were taking off to intercept him but Sqn. Ldr. Pike immediately dived on to the leading aircraft which he put out of action. He then carried out low-flying attacks on other aircraft on the ground and, although engaged by another fighter which was finally disabled, succeeded in setting fire to four and damaging a further four of the enemy's aircraft. Although his own aircraft was severely damaged, Sqn. Ldr. Pike flew it back to base and landed safely without injury to his crew. On the second occasion he set fire to four enemy bombers, photographed the result and returned to base by night. During the past seven months, Sqn. Ldr. Pike has also carried out 29 anti-submarine patrols and 24 convoy escort patrols. He has displayed great courage and devotion to duty throughout.



STEPPING OUT: A Coastal Command Lerwick getting on to its step for taking off. The Lerwick is powered by two Bristol Hercules of 1,350 h.p. each.

Wing Commander Geoffrey SHAW—No. 608 Squadron, Auxiliary Air Force.

Flight Lieutenant Arthur Forbes JOHNSON—No. 204 Squadron.

Acting Flight Lieutenant Ralph McEwen MOTTRAM—R.A.F.V.R., No. 53 Squadron.

Flying Officer James Grant FLEMING—No. 201 Squadron.

Pilot Officer Robert ARMSTRONG—No. 500 Squadron.

Some of the above officers have been engaged on convoy escort duty in all kinds of weather by day and night. One has on two occasions directed surface vessels to the rescue of seamen adrift in the open sea. One was detailed to attack E boats off the French coast, and although wounded by enemy aircraft during the attack he flew his own aircraft safely back to base.

DISTINGUISHED FLYING MEDAL.

Sergeant Robert William GELLARD—No. 53 Squadron.

Sergeant Edward Ernest MATTY—No. 224 Squadron.

Sergeant William Eric WILLIAMS—No. 53 Squadron.

THE King has been graciously pleased to approve the following award:—

GEORGE MEDAL.

A/C.2 H. DEWS.—During a heavy air raid an A.F.S. crew were endeavouring to release a woman and child who were pinned against the basement wall of a demolished building by an iron girder. Fire was raging at the time and the whole building had collapsed upon the basement, out of which, therefore, there was no exit.

The woman and child could be plainly seen down the side cellar wall and frantic efforts were made to release them, as the heat was intense and the smoke suffocating. Numerous members of the A.F.S. had given valuable assistance, but the combination of the heat and smoke had caused them to become exhausted.

At this point, Aircraftman Dews took up a position full length on the debris and dug away with his hands at the rubble surrounding the woman, but could not make a very substantial hole as the way was blocked by a dead body, an iron girder and baulks of timber. It was evident that the only thing to do was to get into the hole which had been made and try to release, at least, the child, because the heat and smoke were becoming more intense.

Aircraftman Dews immediately volunteered. He forced his body, head foremost into the hole, but several times he had to extricate himself on account of the heat. This was overcome by playing the hose upon him as he was in the hole. At last he reached the child and crawled back with her in his arms.

Dews then freed the woman, who was pulled out of the hole. Shortly after their release the fire spread to the spot where they had been trapped.

Telephonists Decorated

THE KING has been graciously pleased to approve the following awards for gallantry to members of the civil staff of the Air Ministry.

M.B.E.

CHRISTOPHER BONE and FRANCIS MCCULLOUGH, telephone operators, Air Ministry Outstation.

An R.A.F. station was dive-bombed by about twenty enemy aircraft. Bone and McCullough, who are employed at the station as civilian telephone operators, remained at their post (which was only partially protected) until the windows, door and roof collapsed. Bone received a superficial scalp wound and injuries to his shoulder and forearm which incapacitated him for two weeks. McCullough suffered a superficial scalp wound, but after receiving attention he returned to the telephone exchange and continued his duties. Although unexploded bombs were reported in the roadway outside the telephone exchange, McCullough carried on with his duties.

Both men displayed an unselfish devotion to duty without regard to their personal safety.

COMMENDATIONS

EDWARD ALBERT VICTOR TUCKWELL, leading storeman, and AUBREY ALFRED TURNER, fitter.

Mr. Tuckwell, a leading storeman, was on duty at an R.A.F. station when the main stores received a direct hit and burst into flames. Mr. Tuckwell, who is 40 years of age, was instrumental in salvaging large quantities of valuable technical equipment from the stores, despite personal risk from smoke and flames. He also rendered valuable assistance in salvage operations after a second enemy attack two days later.

Mr. Turner showed great courage in entering a shed containing transport vehicles at an R.A.F. station which had been attacked by enemy bombers. He removed as many of the serviceable vehicles as possible, although it was known that at least one delayed-action bomb was somewhere in the building. During the whole time that he was in the danger area he never ceased working at the highest pressure, and at the same time he was continually encouraging those around him.

Roll of Honour

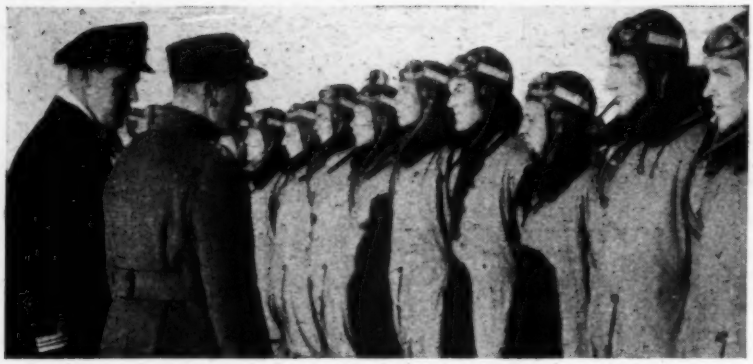
Casualty Communiqué No. 60.

THE Air Ministry regrets to announce the following casualties on various dates. The next of kin have been informed.

KILLED IN ACTION (WHILE FLYING IN OPERATIONS AGAINST THE ENEMY).—Flt. Lt. P. L. Billing, 39297; F/O. J. W. Bocca, 41520; Sgt. E. J. Bonney, 580480; A/C.1 D. J. P. Bradley, 627135; P/O. F. R. Bullot, 40986; P/O. D Custerson, 83273; Sgt. W. Harker, 749391; F/O. A. P. B. Holmes, 90038; Sgt. A. R. Hooker, 754007; Sgt. R. J. Houchin, 518421; P/O. E. I. C. Johnson, 41931; Sgt. J. Kirkham, 635832; Act. Flt. Lt. G. J. Menzies, D.F.C., 41604; P/O E. E. Orbison, 84659; Sgt. H. Pilling, 755384; Sgt. E. L. Stradwick, 743059; Flt. Lt. R. A. Towgood, 39603; Sgt. R. Tribick, 625678; Sgt. T. W. E. Williams, 911368.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—P/O. L. L. Appleton, 40497; Sgt. E. R. Clarke, 564585; Sgt. S. P. Connell, 580913; P/O V. A. Cunningham, 36212; L.A/C. J. H. Edwards, 540912; Sgt. A. E. G. Everest, 643045; Sgt. H. Hutchinson, 581390; Cpl. A. G. Kendrew, 624417; P/O. R. W. Roots, 36202; P/O. E. J. H. Sylvester, 90556; F/O. K. R. H. Sylvester, 39907; Sgt. A. D. Wilson, 971171; Act. Flt. Lt. E. G. Winning, 39204.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—F/O. J. H. L. Allen, 39957; Sgt. A. J. Baum, 581137; Sgt. W. S. Bissett, D.F.M., 751016; L.A/C. P. I. Bligh, 541182; P/O. J. Boon, 40597; Sgt. R. J. Buckley, 987890; P/O. M. A. Butler, 42103; Sgt. N. W. Carlile, 581270; P/O. A. D. Carter, 40887; P/O. F. N. Cawse, 80543; L.A/C. C. C. Child, 541344; P/O. S. Christensen, 76458; F/O L. R. Clisby, 40043; F/O. J. H. Coghlan, D.F.C., 37719; P/O. H. J. Cook, 77351; Sgt. J. R. Cowsill, 741936; P/O. C. D. Crawley, 41380; Sgt. J. K. Crawley, 580572; Sgt. L. C. W. Daisley, 741278; Sgt. J. L. Dewhurst, 580488; A/C.2 D. Duggan, 631247; P/O. C. O. Dunkels, 42822; Flt. Sgt. W. A. Dunn, 563086; F/O. J. P. Dyer, D.F.C., 39073; Sqn. Ldr. G. Emms, 05170; L.A/C. P. R. V. Ettershank, 551709; P/O. S. J. A. Evershed, 80810; A/C.1 C. E. Flanigan, 552105; F/O. A. R. Fordham, 70220; Sgt. T. Fortune, 521800; Sgt. T. A. H. Gough, 740435; P/O. R. F. Gower, 40693; F/O. J. W. Graafstra, 39381; P/O. A. R. Gulley, 33385; P/O. L. M Hamilton, 76906; P/O. G. F. Harding, 33438; P/O. E. A. Harris, 77934; P/O. M. L. G. Hen-



SOON FOR OPERATIONS : Crown Prince Olav of Norway inspecting Norwegian airmen under training in Canada.

derson, 33407; P/O. G. Henocq, 82688; Sgt. S. H. Holman, 740337; Sgt. A. H. Hooper, 700445; Sgt. K. W. Hughes, 581182; Sgt. J. A. Hunter, 628333; P/O. G. H. Jackson, 40831; F/O. F. R. Jamieson, 37855; Sgt. W. Jeffrey, 564866; Sgt. P. W. N. Jelley, 751725; L.A/C. S. Johnson, 541085; Sgt. J. B. Keegan, 580581; Act. Sgt. A. V. Knowles, 530226; L.A/C. C. D. Lampard, 615948; Sgt. J. H. Lawrenson, 580791; Flt. Lt. A. W. Lee, 37323; L.A/C. C. R. A. Lovejoy, 518071; A/C.2 W. J. McCarthy, 625295; L.A/C. A. D. Mackenzie, 623407; A/C.1 S. Martin, 550964; Act. Flt. Lt. R. V. Meredith, 39746; L.A/C. A. E. Millard, 615087; P/O. D. K. Milne, 42628; Flt. Sgt. L. G. Moores, 563572; P/O. I. C. Moorwood, 42253; A/C.1 E. Morton, 629523; Sgt. R. E. Newbatt, 580271; Sgt. L. D. Nineham, 551747; A/C.1 S. C. Ogilvie, 632492; P/O. D. A. J. Parfitt, 42875; Flt. Lt. D. Persse-Joynt, 90322; Sgt. A. N. Phillips, 580524; Sgt. G. Reid, 746818; F/O. E. H. Ross, D.F.C., 40060; Sgt. J. F. Sandall, 516159; Sgt. A. F. Sedgwick, 523566; Sgt. J. Simpson, 526029; P/O. D. M. Slatter, 44597; Flt. Sgt. C. L. Sumpster, 564432; P/O. C. V. Thomas, 41963; Sgt. E. W. Tough, 581008; P/O. A. L. Treanor, 41965; Sgt. D. Wallace, 628797; P/O. P. Weil, 41971; A/C.1 J. Wells, 617573; Sgt. C. T. White, 580429; P/O. R. C. Whittaker, D.F.C., 40450; F/O. O. L. Williams, 39091.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW REPORTED KILLED IN ACTION.—Sgt. W. E. Clegg, 741062.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—Sgt. J. R. Barnes, 751591; Sgt. J. I. Johnson, 520406; Sgt. A. B. Lattimer, 755367; Sgt. H. G. W. Martin, 744964; Sgt. G. A. Ross, 754735; F/O. S. A. Waugh, 41504.

WOUNDED OR INJURED IN ACTION.—Sgt. D. G. Barbone, 549793; F/O. D. V. C. Cotes-Preedy, 41987; Sgt. L. A. Crozier, 740863; P/O. F. W. Hosken, 79566; F/O. C. J. Laubsgher, 70384; P/O. G. F. Marriott, 84311; Flt. Lt. C. G. S. Robinson, 37892; Sgt. W. T. Woodland, 902891.

DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—Sgt. G. T. Hadnam, 755274; F/O. P. McD Hartas, 44407.

MISSING BELIEVED KILLED IN ACTION.—F/O. L. T. Benson, 40876; F/O. E. G. Bidgood, 42098; P/O. R. J. Boret, 42554; F/O. R. W. Clarke, 70849; Sgt. W. G. Cunnington, 740754; P/O. J. M. Horrox, 85268; F/O. P. W. Horton, 42128; Sgt. D. A. G. Matthews, 566240; Sgt. H. C. Orchard, 523288; P/O. H. S. Sadler, 44825; F/O. J. R. Walker, 41500.

MISSING.—Sgt. J. Arbuthnott, 564104; Sgt. W. J. Baird, 742402; P/O. A. H. Blackett, 42459; Sgt. W. S. R. Browning, 755933; Sgt. F. A. Colson, 553425; Sgt. R. J. Couser, 965050; Sgt. A. J. Croker, 527080; Flt. Lt. B. B. St. G. Daly, 25070; Sgt. H. O. Denchfield, 748168; Sgt. R. F. J. Duncan, 641010; Sgt. R. I. Eastwood, 748735; Flt. Lt. J. R. Fishwick, 33246; Sgt. J. L. Franco, 652586; Sgt. L. Greenwood, 553918; P/O. M. P. Griffiths, 81939; Sgt. T. R. H. Hawkes, 651468; Sgt. A. G. Hayman, 580515; Sgt. J. E. Hogg, 969800; Sgt. L. W. Howard, 751195; P/O. G. H. F. Innis, 43036; Sgt. R. C. Jones, 748624; Sgt. J. L. Jones, 967660; Sgt. J. T. Kennett, 751061; Sgt. P. R. Lanchbery, 741830; Wing Cdr. D. P. Lascelles, 26086; P/O. R. G. Lewis, 41852; A/C.1 A. J. McIntosh, 776329; P/O. S. H. Miller, 81016; P/O. K. M. Millist, 42420; Sgt. H. Mitchell, 751210; P/O. H. W. Noble, 42425; Sgt. T. P. O'Byrne, 743014; P/O. W. E. Peers, 88011; Sgt. F. A. Perry, 755035; Sgt. H. W. Pettit, 745645; Sgt. K. G. Rowley, 755531; Sgt. J. B. Rutherford, 519262; Sgt. H. P. Shipley, 742481; Sgt. A. T. Smith, 755419; Sgt. J. R. Stoker, 742978; F/O. W. K. B. Thomas, 72251; Sgt. C. B. Thomson, 741813; Sgt. T. Wareing, 516730; Sgt. J. A. D. Wood, 623845.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE (WHILE ENGAGED IN NON-OPERATIONAL FLYING DUTIES OR ON THE GROUND THROUGH ENEMY ACTION).—A/C.2 R. Peck, 1006143; Sgt. W. Warren, 349651; A/C.1 L. T. Winsborrow, 845292.

KILLED ON ACTIVE SERVICE.—A/C.2 T. W. Allan, 1012096; Sgt. J. K. Blencoe, 944792; P/O. G. C. Blunt, 87439; A/C.2 H. Brough, 1012040; Sgt. E. Brown, 638323; A/C.1 W. E. Browning, 639264; Act. Flt. Lt. P. A. Burnell-Phillips, D.F.M., 37848; P/O. A. W. Burnet, 88248; Sgt. D. H. Cameron, 517813; Sgt. L. E. Clayton, 745519; A/C.1 R. P. Colman, 617159; Sgt. B. H. Cooke, 580014; Sgt. E. W. Death, 747876; Flt. Lt. T. P. De La Rue, 70171; A/C.2 A. Doig, 1059966; Sgt. S. C. Draper, 967236; P/O. R. L. Flewelling, 42703; Sgt. V. M. Foot, 539627; P/O. T. M. C. Genney, 79204; A/C.2 W. E. G. Greenhead, 749874; Sgt. R. Guest, 938872; A/C.1 I. K. Hampson, 943310; A/C.2 G. E. Hand, 1164746; A/C.1 C. W. S. Hawkins, 905994; Sgt. J. T. Hawthorne, 973032; P/O. G. M. Head, 42224; Act. F/O. A. R. Hill, 83998; L.A/C A. A. Hindmarch, 1154267; Wing Cdr. W. T. Holmes, 19053; Cpl. A. H. J. Hookings, 842777; Flt. Lt. A. S. Hunter, 90222; Sgt. A. R. Jacobs, 748209; L.A/C. J. A. Jones, 1154606; Sgt. W. D. Kimber, 742859; A/C.2 R. Kirk, 1012122; A/C.2 R. C. Lawrence, 1291948; A/C.2 W. A. McKay, 1012136; A/C.2 E. F. Martin, 1188084; Sgt. A. H. May, 365514; F/O. J. F. M. Millar, 42251; A/C.2 S. Miller, 989853; Sgt. E. G. Morris, 902415, A/C.2 F. W. J. Myles, 1293271; P/O. C. W. Noel, 84201; L.A/C. E. O'Dwyer, 940041; L.A/C. W. D. Oldroyd, 654247; Sgt. H. M. Pattinson, 651853; L.A/C. T. B. Pearson, 1006454; Act. Cpl. R. C. Pedley, 922076; A/C.1, F. G. E. Penberthy, 622890; A/C.2 G. W. Pope, 1352297; L.A/C. G. F. Pratt, 1002544; Sgt. T. Reay, 751646; F/O. C. R. S. Rich, 42439; Sgt. J. Robson, 968137; Act. Cpl. N. E. Rowe, 905205; P/O. R. W. Sloan, 89812; P/O. A. Smith, 84307; P/O. P. L. Stephens, 87894; Sgt. J. F. Thurlbeck, 754791; A/C.1 C. H. Waters, 865245; F/O. P. I. Wheeler, 41509; A/C.2 L. Willshaw, 1194950; A/C.2 T. J. Wood, 1263490; A/C.2 G. F. Woodbine, 1194832; Sgt. H. J. Wotton, 745641; A/C.1 M. A. G. Yost, 654271.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—L.A/C. W. H. Higgins, 635167; P/O. R. W. Newman, 79092; Act. Sqn. Ldr. R. M. Sanders, 75033; Act. Flt. Lt. H. E. Symons, 72952; Act. Flt. Lt. G. L. P. Zech, 73495.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Act. Sgt. F. G. Bryant, 580939; Sgt. P. G. V. Hemsley, 740112; Sgt. R. Micklethwaite, 636876; Sgt. A. Scott, 759142; A/C.2 J. Shearer, 625176; Sgt. J. A. Smith, 741944.

WOUNDED OR INJURED ON ACTIVE SERVICE.—Sgt. F. A. Ballentyne, 840011; L.A/C. W. C. Bone, 1154497; P/O. C. W. W. Cooper, 75688; W/O. J. W. Court, 352953; Sgt. J. Harding, 751347; Sgt. R. Harley, 779017; A/C.2 A. Kent, 1350617; Sgt. T. J. McHugh, 653675; Act. F/O. R. J. Mansfield, 44265; P/O. W. H. H. Mussett, 78709; F/O. R. B. Osborn, 74686; A/C.2 G. Robinson, 1063280; Sgt. C. Smith, 741069; L.A/C. C. Spanton, 649713.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Sgt. H. E. Bennett, 758075; A/C.1 H. L. Jelly, 976605; A/C.2 J. E. Lowe, 1026738; A/C.2 E. S. Orbell, 1352331; A/C.2 A. T. Osbon, 928210; Sgt. H. F. Rampley, 905139; Sgt. S. Summersgill, 759004.

PREVIOUSLY REPORTED WOUNDED OR INJURED ON ACTIVE SERVICE, NOW REPORTED DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—A/C.1 J. A. Pluckrose, 845814.

DIED ON ACTIVE SERVICE.—A/C.2 J. H. Barlow, 1025643; A/C.2 H. Beiser, 774152; L/A.C. L. H. Bellringer, 1164831; L.A/C. R. C. Brown, 799662; A/C.2 R. H. Casely, 1259477; P/O. P. B. Coleman, 88462; P/O. I. R. Currie, 85944; A/C.1 G. Dawson, 850567; A/C.2 C. L. A. Dods, 963206; A/C.1 J. Duffy, 306077; A/C.2 J. E. Fitznewton, 1115247; A/C.2 A. W. Gibbons, 1258420; A/C.2 P. Glen, 1017699; L.A/C. P. E. Godfrey, 637923; A/C.2 A. S. Hammond, 1200763; Cpl. R. E. Hester, 62262; A/C.2 C. F. Holmes, 928175; L.A/C. J. K. Irwin, 901138; A/C.2 A. T. R. Laing, 1359179; A/C.2 H. Levy, 775546; A/C.2 H. P. Milner, 1359497; P/O. G. H. Pittam, 82764; A/C.2 A. R. J. Renaut, 1019424; L.A/C. A. Richardson, 545741; L.A/C. V. Richardson, 935945; A/C.2 G. W. Robinson, 1210950; Sgt. J. Salmon, 935602; A/C.2 R. Stewart, 927424; Sgt. R. A. M. Stone, D.F.M., 563238; A/C.2 H. Thwaytes, 1069816; A/C.2 J. Topping, 1028034; A/C.1 J. Tully, 937883; L.A/C. H. Walton, 643435; A/C.2 J. V. Warren, 1158624; L.A/C. K. G. Wheeler, 621799; A/C.2 T. R. Williams, 1259244; L.A/C. J. Wilson, 533256; Sgt. T. H. Wood, 633268; W/O. D. E. Wren, 246108; F/O. A. R. Yates, 79723.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Wing Cdr. G. B. Keily, D.F.C., A.F.C., 27256; L.A/C. H. L. Pace, 903833; F/O. J. H. Ward, 40963.

SERVICE AVIATION

Women's Auxiliary Air Force

DIED ON ACTIVE SERVICE.—A/CW.1 E. M. C. Halley, 882967.

Royal Canadian Air Force

MISSING.—Sgt. D. S. Craik, R.61304.

WOUNDED OR INJURED ON ACTIVE SERVICE.—P/O. J. G. Pidduck, J.2828.

Royal New Zealand Air Force

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Sgt. D. M. Walker, NZ.40668.

Prisoners of War

NEXT-OF-KIN, if able to identify the men from the information published, are requested to advise the Casualty Branches of the Services concerned, forwarding regimental or any other details.

The following is the latest list of British prisoners of war as received from enemy sources:—

IN GERMAN HANDS.

P/O. J. H. GREEN, Port Albion, British Columbia.

Sgt. H. E. FISHER, Hillfield Avenue, Hornsey, London.

Sgt. A. L. DRYSTON, Chaldon Common Road, Caterham, Surrey.

Sgt. R. W. JONES, Little Gaddesden, Berkhamsted, Herts.

Sgt. R. F. BAILY, Streatley Road, Erdington, Birmingham.

Sgt. W. R. GARRVEACH, Dalkey, Co. Dublin.

Sgt. H. G. HEDGE, Elder Street, Dunedin, New Zealand.

A DIFFERENT LINE : Capt. H. H. Balfour, M.P., M.C., Under-Secretary of State for Air, tries his hand at clay pigeon shooting which forms part of the training for air gunners. Capt. Balfour was a fighter pilot in the last war.

AVIAT ntinued)

69; L.A/C.
CEIVED ON
t, 758075;
. E. Lowe,
331; A/C.1
ey, 905139;
R INJURED
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ON ACTIVE
914.
H. Barlow,
A.C. L. H.
n, 799692;
. B. Cole-
14; A/C.1
s, 963206;
Fitzneweton,
20; A/C.2
y, 637923;
pl. R. F.
928175;
A. T. B.
46; A/C.2
Pittam,
4; L.A/C.
ichardson,
0; Sgt. J.
7424; Sgt.
A/C.2 H.
1028054;
Walton,
; L.A/C.
Williams,
t. T. H.
08; F/O.
ow Re-
G. B.
L. Pace,
Force
C. M. C.
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RVICE.—
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British
rces:—
umbia.
ornsey,
Road,
kham-
ngton,
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New

Sgt. J. HALL (address unknown; wounded in hospital).

Sgt. R. M. WADE, Cable Street, Stoke-on-Trent, Staffs.

(Sgt. Wade's name was broadcast from Germany on February 2, when his home address was unknown.)

Sgt. P. H. CLARKE, Masters Road, West Bridgford, Notts.

Fit. Ltd. A. V. HUNTER, Young Street, Christchurch, New Zealand.

P/O. L. B. BARRIE, Stradella Road, Herne Hill, London.

Sgt. G. D. HOLLIDAY, Sollihull Road, Warwickshire.

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General Duties Branch

The follg. are granted commns. for the duration of hostilities as P/Os. on probn.:—Warrant Officer: (Jan. 25, 1941) R. J. N. Maclachlan. Flight Sergeants: (Jan. 13, 1941) G. A. S. Clift; (Jan 20, 1941) J. R. Ramshaw, D.F.M.; (Jan. 28, 1941) G. H. Pearce; (Jan. 31, 1941) D. S. M. Scott. Sergeants: (Jan. 15, 1941, Sen. Oct. 9, 1940) J. H. Strong, D.F.M.; (Jan. 22, 1941) R. McD. Durham; (Jan. 24, 1941) R. C. Parkhurst; (Jan. 27, 1941) L. R. J. Ovenden; (Jan. 29, 1941) P. Alderson, D.F.M.; (Feb. 3, 1941) P. E. L. Hails. Temporary Sergeant: (Jan. 24, 1941) C. L. Gough.

The follg. P/Os. on probn. are confirmed in their appts. and promoted to the war substantive rank of F/O.:—(Dec. 23, 1940) R. W. Pye, R. L. Wade; (Jan. 17, 1941) A. J. D. Hitchman, A. E. Lowe, A. J. H. Roberts, A. Brindley, H. R. Crowley, C. W. Grant, H. A. Haarhoff, D.F.C., J. H. Higgleton, A. L. Holland, A.F.M., M. Kenny, G. Moir, W. J. Read, W. Sanders.

The follg. Fl. Lts. are promoted to the rank of Sqn. Ldr (temp.):—(Sept. 1, 1940) B. B. St. G. Daly (Capt., Lanc. Fus.); (Dec. 1, 1940) P. Legge (Capt., R.A.).

The follg. F/Os. are promoted to the war substantive rank of Flt. Lt.:—(Sept. 3, 1940) J. C. Breese, D.F.C., F. G. Dutton, W. H. Edwards, D.F.C., A. B. Mulligan, D.F.C., T. M. W. Smith, D.F.C.; (Dec. 1, 1940) C. Y. Buckley; (Dec. 3, 1940) N. A. Edwards; (Dec. 6, 1940) H. C. Bailey, R. Thomas, D.F.C., R. D. Williams; (Dec. 8, 1940) A. H. Siminson; (Dec. 15, 1940) J. D. Haskins; (Dec. 18, 1940) H. G. Paul, D.F.C.; (Dec. 31, 1940) R. A. G. Ellen, J. W. Stephens, D.F.C.; (Jan. 4, 1941) J. R. Tobin; (Jan. 6, 1941) J. H. Dunn; (Jan. 7, 1941) D. L. Wolfe; (Jan. 10, 1941) C. Cakebread, J. G. Fletcher; (Jan. 12, 1941) P. McC. Bond, W. J. Burnett, D.F.C., P. J. A. Byers, L. H. Eno, W. H. Flint, K. J. Henderson, D. S. G. Honor, D.F.C., D. W. S. Howroyd, L. F. Malone, D.F.C., R. M. Milne, D.F.C., A. W. H. Reader, M. W. H. Uphill; (Jan. 23, 1941) E. L. Frith, D. C. Heilard; (Jan. 24, 1941) G. A. Edney; (Jan. 30, 1941) J. O. Barnard, D. R. S. Bevan-John, G. M. Carmichael, R. C. Cobbe, J. E. T. Haile, R. F. Halliwell, J. H. Iremonger, C. W. McN. Newman, G. H. M. Pirie, W. Pitt-Brown, M. Savage, A. C. Triptree, C. M. Wright, R. B. Wright; (Feb. 12, 1941) W. H. George, D.F.C., B. Ruffell, S. L. Sigurdson; (Feb. 18, 1941) W. T. Brooks.

The follg. P/Os. are promoted to the war substantive rank of F/O.:—(April 7, 1940, Sen. Jan. 10, 1940) B. Everton-Jones; (April 12, 1940) R. M. Coste; (Sept. 3, 1940) R. S. A. Churchill, B. W. Peryman, H. A. T. Skehill, R. D. Wawn; (Sept. 30, 1940) H. O. Jones; (Oct. 2, 1940) L. S. Adams, T. G. Hynes, D.F.C.; (Nov. 6, 1940) R. H. Edwards, R. I. C. Macpherson, P. G. Royle, H. S. P. Williams, J. D. Towlson, E. D. Pennington, H. P. Clark, D.F.C.; (Dec. 9, 1940) I. M. Muir; (Dec. 16, 1940) H. J. Mann; (Dec. 27, 1940) D. W. A. Stones, D.F.C.; (Jan. 6, 1941) D. F. Davies, J. C. M. Hawley, T. D. Misselbrook, A. J. Stevens, R. P. Wigley-Jones; (Jan. 13, 1941) J. M. Ennles, D. J. Isted, E. S. S. Nash; (Jan. 31, 1941) W. D. Boxwell; (Feb. 1, 1941) I. H. Cosby, G. Parker; (Feb. 6, 1941) P. T. Patenall.

P/O. W. S. Rea is promoted to the war substantive rank of F/O. (Aug. 4, 1940) (substituted for notifn. of Nov. 5, 1940.

P/O. D. C. Hellard is granted the war substantive rank of F/O. (Jan. 23, 1940).

Air Comdre. D. F. Stevenson, D.S.O., O.B.E., M.C., is granted the acting rank of Air Vice-Marshal (Feb. 17, 1941).

The follg. P/Os. relinquish the acting rank of Flt. Lt.:—(May 25, 1940) S. H. Cruise (since promoted); (Jan. 16, 1941) D. F. H. Brown.

The follg. are transferred to the Technical Branch (April 24, 1940):—Sqn. Ldrs.: G. L. Best, R. P. Cauthery, A. H. Harrison, D.S.M., W. L. Houlbrook, J. W. Hutchins, A. G. Powell, C. Snow. Flt. Lt.: T. E. J. Fitton.

P/O. D. A. Andrews (2nd Lt., R.A. (T.A.)), relinquishes his temp. commn. on return to Army duty (Jan. 17, 1941).

P/O. R. G. Piddocke resigns his short service commn. (Oct. 17, 1940).

P/O. C. D. Warde resigns his commn. (Jan. 31, 1941).

Errata

In notifn. of Nov. 5, 1940, concerning F/O. J. E. R. Penhausen. *For* R. Penhausen *read* Riepenhausen.

The notifn. of Dec. 31, 1940, concerning Temp. Flt. Sgt. H. R. Bailey should have appeared under the heading "R.A.F.," not "R.A.F.V.R."

NO. 1 SQUADRON A.T.C.: Air Comdre. J. A. Chamier, Corps Commandant, inspects No. 1 Squadron of the Air Training Corps.

Technical Branch

The follg. are granted commns. for the duration of hostilities as F/Os. on probn.:—Warrant Officers: (Jan. 14, 1941) P. B. Gilbert; (Jan. 16, 1941) F. W. Gillham; (Jan. 24, 1941) W. Wilson; (Jan. 29, 1941) T. R. Knight; (Feb. 1, 1941) D. E. P. Baker; (Feb. 1, 1941) B. T. T. Pook. As P/Os. on probn.:—Warrant Officers: (Dec. 30, 1940) C. A. Fiddick; (Jan. 27, 1941) E. S. S. Hobbs; (Jan. 28, 1941) T. Hughes; (Feb. 1, 1941) J. E. de M. Blum; (Feb. 1, 1941) P. J. Dunlop. Flight Sergeants: (Jan. 25, 1941) I. Pangbourn; (Feb. 1, 1941) W. H. E. Cragg.

The follg. Sqn. Ldrs. are promoted to the rank of Wing Comdr. (temp.) (Sept. 1, 1940):—C. Snow, A. H. Harrison, D.S.M., H. H. Chapman.

Administrative and Special Duties Branch

The follg. are granted commns. for the duration of hostilities as F/Os. on probn.:—Warrant Officer: (Jan. 31, 1941) D. J. Pickering. As P/Os. on probn.:— Warrant Officer: (Nov. 10, 1940) F. A. Ridge. Corpl.: (Jan. 28, 1941) G. Rutherford. As Act. P/O. on probn.:—Flight Sergeant: (Jan. 31, 1941) R. W. D. Hier.

P/O. on probn. R. O. Paisley is promoted to the war substantive rank of F/O. on probn. (Nov. 11, 1940).

Equipment Branch

W/O. C. Herrington is granted a commn. for the duration of hostilities as F/O. on probn. (Jan. 25, 1941).

P/O. on probation G. E. De La Haye is confirmed in his appt. and promoted to the war substantive rank of F/O. (Jan. 15, 1941).

Act. P/O. on probn. L. H. Dawes is graded as P/O. on probn. (Nov. 14, 1940).

F/O. L. C. Hooke is promoted to the rank of Flt. Lt. (temp.) (Dec. 1, 1940).

R.N. SOAP: Photographers of the Fleet Air Arm receive their technical and flying training at the Royal Naval School of Air Photography. The mark of proficiency is a camera badge worn on the right sleeve.

The notifn. of Feb. 4, 1941, concerning F/O. H. Corfield is cancelled.

Medical Branch

Flt. Lt. S. R. C. Nelson, M.D., is granted the war substantive rank of Sqn. Ldr. (Nov. 26, 1940).

Royal Air Force Reserve

RESERVE OF AIR FORCE OFFICERS.

General Duties Branch

The follg. F/Os. are promoted to the war substantive rank of Flt. Lt.:—(Oct. 31, 1940) M. W. Donaldson; (Jan. 1, 1941) H. A. Marsh.

F/O. N. T. Tangye is granted the war substantive rank of Flt. Lt. (Mar. 3, 1940).

Sqn. Ldr. W. E. B. Dowling relinquishes his commn. in class CC on appt. to a commn. in the R.A.F.V.R. (Feb. 6, 1941).

The follg. relinquish their commn. in class CC on appt. to hon. commns. in the R.A.F.V.R. (Feb. 5, 1941):—Wing Cdr.: H. Hemming, A.F.C. Flt. Lts.: G. Adams, M. Spender.

Royal Air Force Volunteer Reserve

General Duties Branch

The follg. are granted commns for the duration of hostilities as F/Os.:— (Jan. 21, 1941) J. Cameron, W. Fisher, J. R. Smith, N. H. Thompson. As P/Os. on probn.:—(Jan. 23, 1941) S. Davidson. Sergeants: (Nov. 3, 1940) R. H. Annan, W. Astell, K. W. F. Davenport, E. E. Dennis, L. J. E. Goldfinch, D. E. Healy, J. M. Inglis, J. Irwin, K. A. S. Leslie, F. E. H. Lovelace, G. A. Marshall, M. G. F. Nockolds, J. C. Pare, J. I. Pengelly, R. Reynolds, P. E. H. Thomas, J. P. Tremlett, A. C. Tulley, J. H. Ward, J. K. Wilson; (Nov. 29, 1940) D. M. Anderson, H. W. J. Dare, A. J. G. Evans, A. J. C. Hamilton, E. B. Horn, A. I. James, J. S. Lamplough, R. H. Likeman, W. Michelson, F. M. Moss, J. M. Sayers, A. P. Singleton, G. S. Smith, G. A. Tovey, J. L. Van Breda, D. L. D'A. Willis; (Jan. 1, 1941) A. C. Woodley; (Jan. 23, 1941) N. Montefiore; (Jan. 24, 1941) E. T. Heeiss, (Jan. 25, 1941) J. H. Lacey, D.F.M.; (Jan. 29, 1941) H. D. Richardson; (Jan. 30, 1941) H. G. Hazelden; (Jan. 31, 1941) R. J. Coombs, L. D. Barnes. Leading Aircraftmen: (Nov. 17, 1940) B. Jones, J. D. McC. Macleod, D. A. E. Midgley, A. Potter; (Nov. 30, 1940) E. D. Vivian (Substituted for notifn. of Jan. 14, 1941); (Dec. 30, 1940) J. L. Briggs, D. F. Caird, P. W. Coggins; (Jan. 12, 1941) M. M. Pillans; (Jan. 16, 1941) J. F. Heaton, D. J. H. Maltby, L. C. Gregory; (Jan. 25, 1941) D. J. Alexander, R. Anne, D. I. Chapman, A. D. M. Gunn, E. B. A. Lemaistre, G. B. Singlehurst; (Jan. 26, 1941) J. Gill, D. H. Ivens. As Act. P/O. on probn.: (Jan. 31, 1941) N. G. Stokes.

The follg. are granted commns. for the duration of hostilities as P/Os. on probn. (Sen. April 25, 1940):—Sergeants: (June 13, 1940) F. W. H. Darlington; (June 15, 1940) P. Blandford; (June 17, 1940) H. C. Barson, R. Reid; (June 18, 1940) D. J. Fielder (Substituted for notifn. of July 9, 1940).

The follg. are granted commns. for the duration of hostilities as P/Os. on probn. (Sen. Nov. 7, 1940):—Leading Aircraftmen: (Nov. 24, 1940) L. D. Birkett; (Nov. 30, 1940) J. L. Baines, L. S. Dobson, T. C. F. Earp, T. P. O'Brien, R. P. Todd, J. O. H. Willing (Substituted for notifn. of Jan. 3, 1941).

The follg. P/Os. on probn. are confirmed in their appts. and promoted to the war substantive rank of F/O on dates stated:—(Nov. 27, 1940) L. Reavell-Carter; (Dec. 17, 1940) W. C. A. Lodge, (Dec. 24, 1940) M. A. F. Hirst, D. G. Lacey; (Jan. 7, 1941) P. T. Candler, M. P. Thompson; (Jan. 13, 1941) C. H. B. Hall, E. Anderton, D. J. D'Alton; (Jan. 15, 1941) A. C. L. Barrett, E. A. Burbridge; (Jan. 17, 1941) F. J. Swain.

The follg. P/Os. on probn. are confirmed in their appts. on Nov. 5, 1940, and promoted to the war substantive rank of F/O. Dec. 17, 1940:—C. M. Gamon, M. J. Miller.

P/O. on probn. P. M. Thurtle is confirmed in

SERVICE AVIATION (Continued)

his appt. on Dec. 2, 1940, and promoted to the war substantive rank of F/O., Jan. 15, 1941.

P/O. on probn. R. K. Keating is confirmed in his appt. on Dec. 3, 1940, and promoted to the war substantive rank of F/O., Jan. 15, 1941.

Act. P/O. on probn. A. H. Dutton is graded as P/O. on probn., Aug. 5, 1940.

F/O. G. T. Swann is promoted to the war substantive rank of Flt. Lt., Jan. 19, 1941.

P/O. D. C. Shaw is granted the war substantive rank of F/O., July 19, 1940.

P/O. on probn. L. W. Thres relinquishes is commn. on appt. to the Royal Canadian Air Force, Jan. 1, 1941.

P/O. G. O. Medaets relinquishes his commn. on account of ill-health, Aug. 24, 1940.

The commn. of P/O. on probn. G. N. Brown is terminated on cessation of duty, Feb. 3, 1941.

Balloon Branch.

The follg are granted comms. for the duration of hostilities as P/Os. on probn.:—Flight Sergeant: (Jan 24, 1941) H. W. Gourlay. Sergeant: (Jan. 27, 1941) W. Walmsley. Corporal: (Jan. 27, 1941) F. J. Powell. Leading Aircraftman: (Jan. 27, 1941) J. L. Fletcher. Aircraftman 2nd Class: (Jan 27, 1941) R. H. Mallock.

P/O. on probn. E. H. Row is confirmed in his appt. and promoted to the war substantive rank of F/O. (Jan 29, 1941).

The follg. Act. P/Os. on probn. are graded as P/Os. on probn.:—(Oct. 15, 1940) J. M. Carrall-Wilcocks; (Jan. 1, 1941) D. J. S. Hall; (Jan. 21, 1941) H. C. Johnston.

The notifn. of Feb. 4, 1941, concerning P/O. T. S. Singleton-Fleming is cancelled.

Administrative and Special Duties Branch.

Maj. W. E. B. Dowling (R.A.R.O.) is granted a commn. as Flt. Lt. (Feb. 6, 1941).

The follg. are granted comms. for the duration of hostilities as F/Os. on probn.:—(Oct 4, 1940) R. Small. Warrant Officer: (Feb. 1, 1941) C. E. Jarvis. As P/Os. on probn.: (July 13, 1940) C. Glossop (Substituted for notifn. of Oct. 29, 1940); (Sept. 18, 1940) V. L. Andersson; (Oct. 20, 1940) L. Wright; (Oct. 22, 1940) G. M. Sorley; (Nov. 13, 1940) C. A. Roberts; (Nov. 21, 1940) C. P. F. Cronin; (Dec. 12, 1940) F. B. Seward; (Dec. 13, 1940) W. L. Peate; (Dec. 27, 1940) A. G. R. Jenkins, M. S. Tupholme, A. Youdan, W. A. Lancaster; (Dec. 30, 1940) W. Roddick; (Jan. 8, 1941) D. I. Stewart; (Jan. 17, 1941) C. H. Webb, M.C.; (Jan. 20, 1941) F. R. F. Wall; (Jan. 24, 1941) C. H. Arnison, M.C., J. E. Aytward, S. H. Bach, R. G. Backrath, J. O. Baker, W. G. Bennett, A. E. Bidwell, H. E. Boucher, M.C., S. E. Brown, N. J. Campbell, F. B. Cattle, W. B. Clark, C. P. Crowley, R. J. Custerson, H. R. X. D'Aeth, G. B. Denty, F. P. Dickinson, M.C., J. S. Dilks, E. J. R. Eaglesham, H. T. Edwards, Allan Embleton-Smith, A. R. Fairbairn, D.F.C., R. G. Finlay, J. B. Fletcher, W. H. Garratt, P. J. L. Goodwin, G. H. B. Gough, A. T. Grime, A. D. Hadden, S. Hare, G. B. Hignett, P. H. E. Hope-Ross, A. R. Innes, A. Ivimey, D. G. Johnson, G. G. K. Laidlaw, F. Morton-Smith, C. Osborne, A. J. Parker, W. A. R. Pepper, G. R. Quinn, D. B. Richardson, G. R. Riddell-Carre, R. A. Schilt, E. G. Sheddon, G. V. Stewart, J. A. Stripe, G. S. Stuart, K. S. Stubbs, F. W. Thirlaway, G. M. Thompson, H. C. Wakefield, H. G. Walker, G. A. W. Williams, O. Q. Wolsey, N. H. Wooding, A. Zielony; (Jan. 25, 1941) P. Roger; (Jan. 27, 1941) S. H. Sharp, W. Todd, D.F.C.; (Jan. 28, 1941) W. G. Airey, S. C. Evans, H. D. Lyon, J. M. Smith, A. Taylor; (Jan. 29, 1941) B. B. Wicksteed; (Jan. 30, 1941) The Hon. B. G. P. Cary; (Feb. 3, 1941) H. G. Betteridge, H. Clark, A. B. Dawson, J. M. L. Drummond, D. W. Fraser, E. P. Icke, H. Lanham, J. W. Lewis, T. Manning, W. D. Morris, A. E. Philpot, G. H. Pilgram, D. Ralph, J. S. Smith, C. E. Squires, W. A. Walkey, C. O. R. Ward, N. Whitehead. Leading Aircraftman: (Jan. 28, 1941) C. H. Goldie. As Act. P/Os. on probn.:—Flight Sergeant: (Jan. 31, 1941) H. S. Valentine. Sergeants: (Jan. 31, 1941) R. F. Hayes; (Jan. 31, 1941) E. Bates; (Jan. 31, 1941) W. P. Murphy, G. A. Podevin; (Jan. 31, 1941) C. Henstock. Corporals: (Jan. 31, 1941) H. J. Lewis, T. N. O. White; (Jan. 31, 1941) S. A. Tomlin; (Jan. 31, 1941) W. J. Crayston; (Jan. 31, 1941) L. Griffiths, F. A. Maddock, S. M. Olley; (Jan. 31, 1941) B. W. May.

The follg. are granted hon. commns. (Feb. 5, 1941):—As Wing Cdr.: H. Hemming, A.F.C. As Flt. Lt.: G. Adams, M. Spender.

The follg. P/Os. on probn. are confirmed in their appts. and promoted to the war substantive rank of F/O.:—(Nov. 6, 1940) R. E. Bright; (Nov. 13, 1940) U. E. C. Carnegy; (Nov. 18, 1940) H. E. Brenack; (Nov. 20, 1940) D. C. Baylis; (Dec. 6, 1940) J. M. R. Jayakar; (Dec. 11, 1940) C. J. Barnett; (Jan. 1, 1941) G. De Gaye; (Jan. 16, 1941) J. E. Helfield; (Jan. 17, 1941) C. R. R. Horton; (Jan. 22, 1941) H. J. Morris; (Jan. 25, 1941) W. K. Sutton; (Jan. 26, 1941) L. E. G. Ames, P. Caddy, E. W. Moses.

P/O. on probn. E. E. Jones is confirmed in his appt. Nov. 5, 1940, and promoted to the war substantive rank of F/O. (Jan. 8, 1941).

P/O. A. H. Carnwath is confirmed in his appt. Nov. 21, 1940, and granted the war substantive rank of F/O. (June 1, 1940).

The follg. Act. P/Os. on probn. are graded as P/Os. on probn.:—(Jan. 25, 1941) R. A. Pinchen; (Feb. 3, 1941) R. J. Le Grand.

The follg. P/Os. are promoted to the war substantive rank of F/O.:—(Dec. 3, 1940) A. T. Chapman; (Dec. 28, 1940) R. D. Barlas.

The follg. P/Os are granted the war substantive rank of F/O.:—(Dec. 11, 1939) G. H. G. Cawthorne; (Dec. 20, 1939) H. H. Bolitho; (Feb. 10, 1940) W. A. McKenzie; (May 1, 1940) H. Dear; (June 8, 1940) R. E. Thomas; (July 11, 1940) A. W. Reynell; (Sept. 25, 1940) F. L. Roberts; (Oct. 25, 1940) E. R. Harley; (Dec. 1, 1940) G. F. M. P. Thompson.

The follg. are transferred to the General Duties Branch:—F/O (Aug. 29, 1940) A. T. Daw; P/O. on probn. (Nov. 18, 1940) A. Payze; (Feb. 4, 1941) R. N. H. P. McDouall.

The follg. are transferred to the Technical Branch:—F/Os. (Apr. 24, 1940) R. M. Rankin, H. J. Lewis, J. C. Lawrence, J. Hyde, G. F. Hyams, F. W. C. Davies, R. P. Broackes-Carter, C. Blake-Smith, L. W. Barney; (May 27, 1940) J. W. Wathes; P/Os. on probn. (Apr. 24, 1940) N. W. B. Bovey (since promoted), W. K. Caldwell (since promoted), A. A. Caney (since promoted), R. L. Cutler (since promoted), D. D. Gray (since promoted), T. H. Herriott, M.B.E., D.S.C. (since promoted), H. I. Hughes (since promoted), L. A. Jackson (since promoted), G. H. M. Miles (since promoted), F. A. Norman (since promoted), F. E. Pickles (since promoted), J. E. Pringle (since promoted), S. J. Wise; (June 22, 1940) A. S. Radford (since promoted); (June 29, 1940) J. W. H. Hiscocks (since promoted); (Aug. 14, 1940) G. W. Bone, A. W. Sharpe; (Aug. 16, 1940) G. A. Houghton, M. R. Jackson, H. F. Maddox; (Aug. 20, 1940) W. A. Webb; (Aug. 24, 1940) H. W. H. Ransome; (Aug. 28, 1940) C. W. Morle; (Sept. 9, 1940) J. A. Payne, T. A. Pringle; (Sept. 17, 1940) S. C. Thorp; (Oct. 13, 1940) H. Tibbenham; (Oct. 16, 1940) E. H. B. Martin; (Oct. 28, 1940) D. M. Anderson, H. I. Whiteley, S. H. Rochester; (Nov. 11, 1940) B. Brooke; (Nov. 24, 1940) T. W. J. Temple; (Nov. 25, 1940) C. R. E. Pope.

The follg. P/Os. on probn. are transferred to the Balloon Branch:—(Mar. 27, 1940) H. H. Brooks, R. T. Lloyd; (Apr. 20, 1940) A. D. Forster; (June 3, 1940) H. G. Lewis.

The follg are transferred to the equipment branch (Feb 1, 1941):—F/O., W. Burton; P/Os. on probn., A. D'A. Anderson, E. W. Comins.

P/O. L. C. Bevis relinquishes his commn. on appt. to a commn. in the Royal Engineers (Feb. 13, 1941).

The follg. P/Os. on probn. relinquish their commns. on account of ill-health (Feb. 14, 1941):—H. P. Bowring, E. D. Hicks, C. H. Watson.

F/O. J. A. D. Wallis resigns his commn. (Feb. 9, 1941).

The commns. of the follg. P/Os. on probn. are terminated on cessation of duty:—(Jan. 6, 1941) C. A. Henning; (Jan. 9, 1941) A. C. T. Lutyens; (Jan. 17, 1941) H. W. Lester.

The notifn. of Jan. 14, 1941, concerning P/O. A. G. Harrison is cancelled.

Meteorological Branch.

The follg. P/Os. on probn. are confirmed in their appts., Aug. 1, 1940, and promoted to the war substantive rank of F/O.:—(Nov. 22, 1940) J. V. Meyer; (Nov. 25, 1940) V. Packer; (Nov. 24, 1940) J. Field; (Nov. 26, 1940) J. R. Jenkins.

Equipment Branch.

P/O. on probn. D. A. Collins is confirmed in his appt., Sept. 9, 1940, and promoted to the war substantive rank of F/O. (Nov. 9, 1940).

The follg. P/Os. on probn. are confirmed in their appts., Sept. 18, 1940, and promoted to the war substantive rank of F/O.:—(Nov. 19, 1940) H. M. Bongard; (Jan. 30, 1941) G. W. Orrock.

The follg. P/Os. on probn. are confirmed in their appts., Nov. 9, 1940, and promoted to the war substantive rank of F/O.:—(Jan. 8, 1941) E. J. Dwyer; (Jan. 20, 1941) D. P. Evans, F. I. J. De Thier, J. E. Howlett, P. C. McQuown, D. W. Styring; (Jan. 22, 1941) R. E. Bonass, R. M. Seymour, E. Welsh; (Jan. 29, 1941) A. R. Markham.

The follg. P/Os. on probn. are confirmed in their appts., Nov. 21, 1940, and promoted to the war substantive rank of F/O.:—(Jan. 20, 1941) M. L. Block, R. E. Butcher, E. L. Cowan, T. W. Howells, A. L. E. Ormond, K. H. Summers, D. K. Wroe; (Jan. 22, 1941) T. A. C. Bell; (Feb. 5, 1941) C. S. Simkins.

P/O. on probn. R. C. Woodland is confirmed in his appt. and promoted to the war substantive rank of F/O. (Dec. 13, 1940).

The follg. Act. P/Os. on probn. are graded as P/Os. on probn.:—(Sept. 28, 1940) F. K. Lott; (Nov. 25, 1940) D. V. Alderton, F. G. B. McKay.

F/O. S. J. Berry is promoted to the rank of Flt. Lt. (temp.) (Dec. 1, 1940).

Accountant Branch.

C. E. Sansom is granted a comm. for the duration of hostilities as Act. P/O. on probn (Dec. 30, 1940).

The follg. P/Os. on probn. are confirmed in their appts. of Oct. 9, 1940, and promoted to the war substantive rank of F/O. (Nov. 26, 1940):—W. R. N. Bithell, H. G. Cain.

P/O. on probn. A. R. Williams is confirmed in his apppt., Oct. 21, 1940, and promoted to the war substantive rank of F/O. (Jan. 3, 1941).

The follg. P/Os. on probn. are confirmed in their appts., Nov. 28, 1940, and promoted to the war substantive rank of F/O.:—(Jan. 22, 1941) J. E. Fortescue, D. W. Pettet, W. G. Roy, A. M. Scott, H. L. Smith, R. C. Umney, L. C. Weatherley.

Medical Branch.

The follg. are granted comms. for the duration of hostilities as F/Os.:—(Jan. 17, 1941) A. M. F. Batty, M.R.C.S., L.R.C.P.; N. F. Kirkman, M.D., B.S., M.R.C.S., L.R.C.P.; E. G. F. Skinner, L.M.S.S.A.; H. F. M. Finzel, M.D., B.S., M.R.C.S., L.R.C.P.; J. A. Duncan, M.B., Ch.B., M.R.C.S., L.R.C.P.; R. W. Crocket, M.B., Ch.B., F.R.F.P.S., D.P.M.; E. C. de M. Morgan, M.R.C.S., L.R.C.P.; P. Citron, M.B., B.Ch.; G. P. McLauchlan, M.B., Ch.B.; R. C. Wm, M.R.C.S., L.R.C.P.; T. H. Whitsitt, L.R.C.P. and S., L.M.; H. Walden, M.R.C.S., L.R.C.P.; W. L. Uprichard, M.B., B.Ch.; L. G. Scott, M.B., B.S., M.R.C.S., L.R.C.P.; T. J. Reid, L.R.C.P. and S.; L.R.F.P.S.; A. Maxwell-Allison, L.R.C.P. and S., L.R.F.P.S.; H. J. M. Holland, M.B., Ch.B.; A. A. Gray, M.B., Ch.B.; W. G. R. Ashley-Emiss, M.R.C.S., L.R.C.P.; G. W. Balfour, M.B., Ch.B.; E. A. Griffiths, L.M.S.S.A.

Flt. Lt. C. M. Dransfield, M.R.C.P., L.R.C.P., resigns his commn. (Jan. 26, 1941).

Dental Branch.

The follg. are granted comms. for the duration of hostilities as F/Os.: (Jan. 28, 1941) A. E. B. Noble, L.D.S.; J. Mort, B.Ch.D., L.D.S.; A. B. Renson, B.D.S.; E. R. Burt, L.D.S.; S. E. Charman, L.D.S.; D. W. M. Fisher, L.D.S.; F. W. Stares, L.D.S.; G. Cappleman, L.D.S.; S. K. Doran, L.D.S.; A. E. Williamson, L.D.S.

The follg. F/Os. are promoted to the war substantive rank of Flt. Lt.:—(Jan. 2, 1941) F. R. Barnett, L.D.S.; N. S. D. Evans, L.D.S.; C. A. E. Tomes, L.D.S.

Chaplains Branch.

The follg. are granted commns. for the duration of hostilities with the relative rank of Sqn. Ldr. (Jan. 1, 1941):—The Rev. R. Lloyd, B.A.; The Rev. B. Kissack, B.A., B.D.; The Rev. G. C. Chambers.

Auxiliary Air Force

General Duties Branch.

F/O. J. H. C. Rowe is promoted to the war substantive rank of Flt. Lt. (Sept. 3, 1940).

The follg. P/Os are promoted to the war substantive rank of F/O.:—(Sept. 17, 1940) G. Keighley; (Oct. 6, 1940) T. S. Brotherstone; (Dec. 1, 1940) D. A. Braithwaite, W. A. Douglas, S. G. Fenwick; (Dec. 2, 1940) A. R. Cousins, I. K. S. Joll; (Dec. 3, 1940) W. P. Barrell, J. Brewster, L. H. Casson, J. B. Hatchwell, T. B. Murray, T. D. Williams; (Dec. 9, 1940) M. J. Appleby, D. M. Crook, D.F.C., P. W. Dunning-White, G. Gordon, P. A. Womersley; (Dec. 10, 1940) F. E. Clark, F. Pilling; (Jan. 11, 1941) W. J. G. Morgan.

Balloon Branch.

P/O. A. W. Bacon is promoted to the war substantive rank of F/O. (Nov. 1, 1940).

Sqn. Ldr. (temp. Wing Cdr.) H. Hall resigns his comm. (Feb. 5, 1941).

Equipment Branch.

F/O. E. H. Lee is transferred to the Administrative and Special Duties Branch (Jan. 28, 1941).

Women's Auxiliary Air Force

The follg. are appointed Assist. S/Os.:—(Feb. 1, 1941) Mrs. S. Gibbon; (Feb. 5, 1941) A/CW.1 V. J. Anthony, A/CW.2 K. M. Bathes, Sgt. B. J. Dobell, Sgt. A. H. Forse, Cpl. B. Gordon Jones, Cpl. M. A. Jackson, Sgt. M. V. Jones, Cpl. M. M. Kendal, Sgt. M. H. Pairpoint, Sgt. M. L. Thompson, A/CW.2 E. Wilson, A/CW.2 I. S. Winton, Sgt. M. F. Wood.

The follg. Assist. S/Os relinquish their appts.:—(Dec. 12, 1940) W. M. Baker; (Feb. 8, 1941) P. D. Downes.

WHISTLE WHILE YOU WORK: The fife section of a W.A.A.F. drum and fife band warming up their instruments.